



UTAH STATE DEVELOPMENTAL CENTER

ADMISSIONS & SAFE HOUSING PROGRAM

[ARCHITECTURAL PROGRAM]

AUGUST 13, 2014

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ADMISSIONS & SAFE HOUSING PROGRAM

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ACKNOWLEDGMENTS

THE FOLLOWING INDIVIDUALS CONTRIBUTED TO THE DEVELOPMENT OF THE UTAH STATE DEVELOPMENTAL CENTER ADMISSIONS AND SAFE HOUSING PROGRAM

Project #2014538

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MHTN #2014538

APPROVALS

WE HAVE REVIEWED THE **UTAH STATE DEVELOPMENTAL CENTER ADMISSIONS & SAFE HOUSING PROGRAM** AND WARRANT THAT IT ADEQUATELY REPRESENTS OUR REQUEST FOR A FACILITY PROGRAM TO FULFILL OUR MISSION AND PROGRAMMATIC NEEDS. ALL APPROPRIATE PARTIES HAVE REVIEWED IT FOR COMPLETENESS AND ACCURACY.


Mack McDonald, Director Utah Department of Human Services Date 8-11-2014


Guy Thompson, Superintendent Utah State Developmental Center Date 8/12/2014


Lucas Davis, Project Manager Utah Department of Administrative Services Date 8/7/14
Division of Facilities Construction & Management

1 | EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

PROJECT FUNCTION & NEED

Since its establishment in 1929, the Utah State Developmental Center (USDC) has provided residential and educational/training services for Utah's developmentally disabled population. In order to continue its high level of service and fulfill the goal of supporting USDC residents to the highest extent possible, the Center is requesting state funding to construct a new Admissions and Safe Housing building.

The new building will provide a purpose-built environment for:

- **the admissions process** for all incoming USDC residents
- **housing for 36 residents**, including: incoming residents for a period of up to several weeks, while an assessment of their long-term needs is completed; long-term housing for USDC residents whose condition is more aggressive and who therefore require a safer, more secure and more durable residential setting
- **office and support space** for the staff members who will work in the facility (approximately 25 per shift)

The USDC admissions process is currently spread among several buildings: Administration (intake meetings attended by the resident, family members and USDC staff and administrators); Medical Services (medical exams and health screenings that are part of the intake process); Transitional Living Center (the residence for incoming males); and Quailrun Apartment #4 (the residence for incoming females).

The Transitional Living Center and Quailrun Apartment #4 currently also house residents with more aggressive conditions. These facilities were designed and constructed as typical housing rather than secure and durable housing, and they are inadequate for their current usage, posing safety risks for residents and staff. They also suffer a high rate of damage, requiring frequent maintenance and repairs.

PROJECT GOALS

The goals for the USDC Admissions & Safe Housing project include:

- to ease and simplify the intake process by consolidating intake events in a single facility
- to increase resident and staff safety by housing residents with more aggressive conditions in a facility that is designed and constructed for those specific needs
- treat USDC residents with dignity and respect by housing them in facilities that are highly functional and effective, as well as aesthetically pleasing

PROGRAMMING PROCESS

The programming process took place from the end of April through the first week of August of 2014. Participants included a core team with representation from the Utah State Division of Facilities & Construction Management (DFCM), Department of Human Services and Developmental Center (USDC).

Space needs input was obtained from the core team and members of the USDC professional staff.

DFCM hired energy, commissioning and exterior envelope consultants, who participated with the programming consultant team engineers and the DFCM Energy Program Director to develop a High Performance Building Standard and an Owner Project Requirements document (OPR) specific to this project.

The programming consultant team engineers met with USDC Support Services representatives for input on project utility and infrastructure needs and existing conditions.

PROGRAM CONCLUSIONS

Location/Site

The project site, a vacant area in the southwest corner of the USDC main campus, was selected prior to the programming process. The footings and foundations of a building previously existing on this site are believed to remain below grade; these will need to be removed as part of the project.

Building Size & Components

The Admissions and Safe Housing facility will be comprised of three identical residential pods of twelve beds each (36 beds total) and a Central Core containing functions that support the entire facility.

The Central Core is 4,735 GSF and each residential pod is 5,805 GSF.

Building Area Summary

Net square feet (NSF)	14,072
Department gross square feet (DGSF)	18,613
Gross square feet (GSF)	22,149

Building efficiency: 64%

Future Construction

The USDC is anticipating constructing a fourth residential pod in the near future as funding becomes available. It is a requirement of the current project that the three-pod building plan and siting accommodate construction of the additional pod. Building systems must also be designed and planned with capacity for the fourth pod. The future, four-pod building will be approximately 28,000 GSF.

Cost Summary

Program construction cost opinion.....	\$5,228,233
Project construction cost budget	\$5,230,871
Program construction cost opinion/GSF	\$236

Project Delivery

This project will be constructed through a design-build delivery method.

Building Performance

The state of Utah DFCM is finalizing a new High Performance Building Standard (HPBS) which will be used in lieu of the US Green Building Council LEED system as a guideline and measure of building performance. For the Admissions and Safe Housing project, DFCM hired energy, commissioning and exterior envelope consultants to work with the planning and design consultants from programming through construction, with the goal of creating a highly efficient and sustainable building. The program consultant team worked together to produce an HPBS and an Owner Project Requirements document (OPR) specific to this project (see Appendices A and B). The project must meet the requirements of the HPBS and OPR as outlined in the appendices.

Project Schedule

The project schedule is anticipated to be:

Issue design-build RFP.....	August 2014
Design-build qualifications due.....	September 2014
Short list announcement	October 2014
Design-build proposals due.....	December 2014
Selection announcement	December 2014
Design complete	April 2015
Construction begins.....	May 2015
Construction completion	June 2016

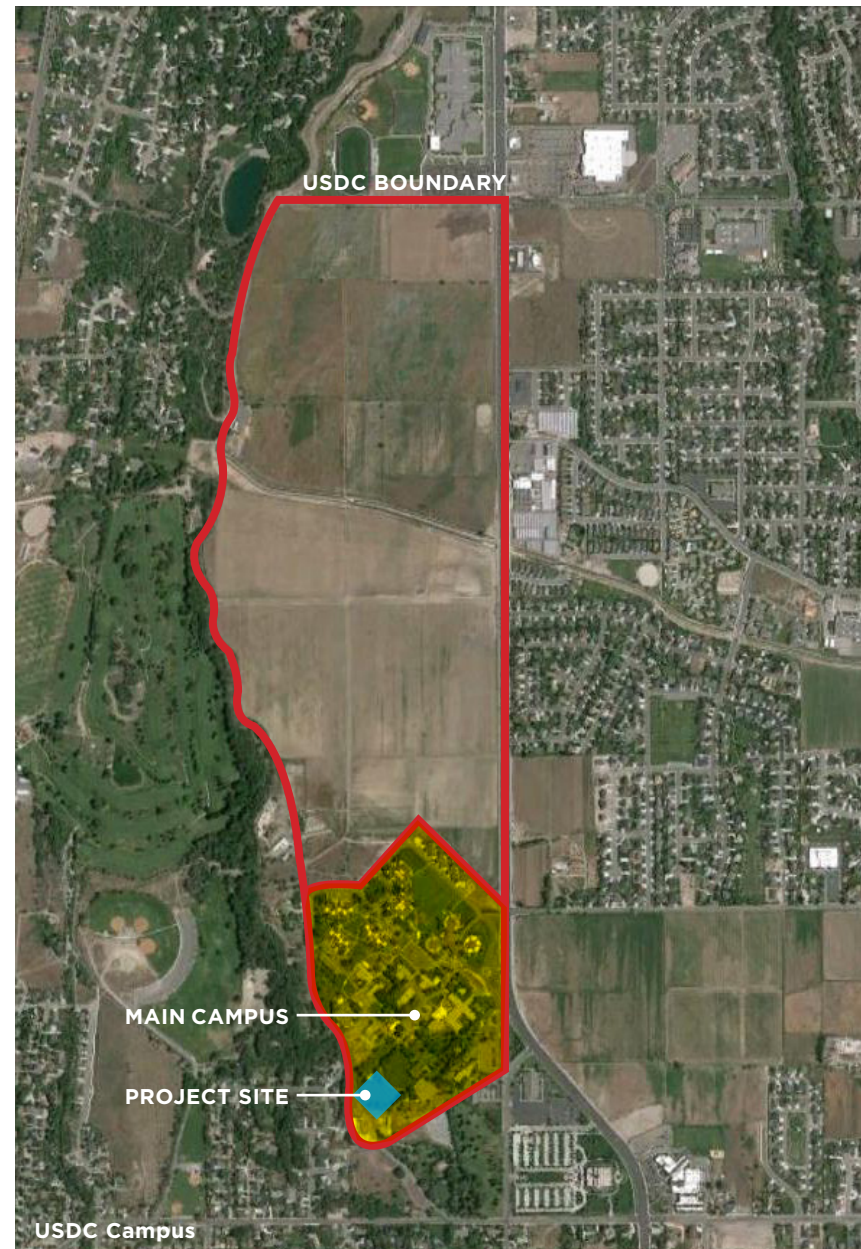
2 | SITE/CIVIL CRITERIA

SITE/CIVIL CRITERIA

GENERAL SITE INFORMATION

USDC Vicinity & Campus

The project is located on the Utah State Developmental Center (USDC) campus in American Fork, Utah. The campus is 250 acres total, a large portion of which is undeveloped. The north 200 acres, originally a working farm for the Center, have been leased in recent years to a local farmer. The developed “main campus”, the site of the Admissions and Safe Housing project, occupies 50 acres at the southern end of the property, and is comprised of approximately 50 residential, programming and support buildings.



Location

The site of the proposed Admissions and Safe Housing building is in the southwest corner of the main campus.

Circulation

Vehicular Access

Vehicular access to the site is from 700 North Street and traveling northwest on 860 East Street, which is a campus road. One can also access the site from 900 East Street, traveling west along 900 North Street or 980 North Street. These are two-lane roads which are part of campus roadway system. They access the proposed building from the south, west and northwest sides.

Pedestrian Access

There are existing sidewalks east of the site that will provide access to the proposed building location and connect it with Pineridge Lodge, the Recreation Center and Valentine Auditorium.

Mass Transit

There are several Utah Transit Authority bus routes that provide service to the USDC campus. The busses travel the campus perimeter road which passes directly adjacent to the proposed building site in the campus southwest corner. There are no designated bus stops; the busses stop at any requested location. The project must provide a sidewalk extending from the perimeter road to the new building entry, for the safety and convenience of mass transit users.



Existing Structures

Adjacent buildings include Pineridge Lodge (a vacant former residential facility), Valentine Auditorium, and a new campus heating plant across 900 North.

Two “Movable Classroom” buildings on the northwest side of the site were being demolished during programming and will be completely cleared from the site before design of the Admissions and Safe Housing building begins.

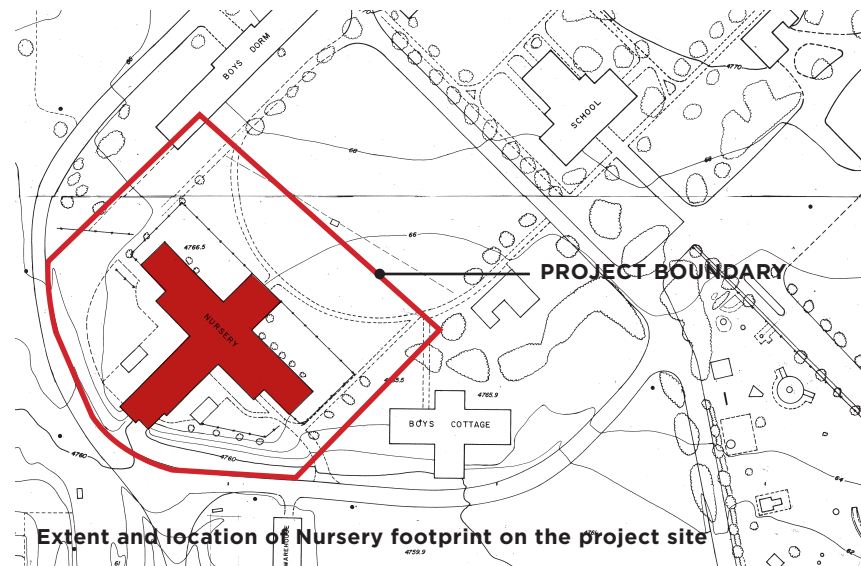
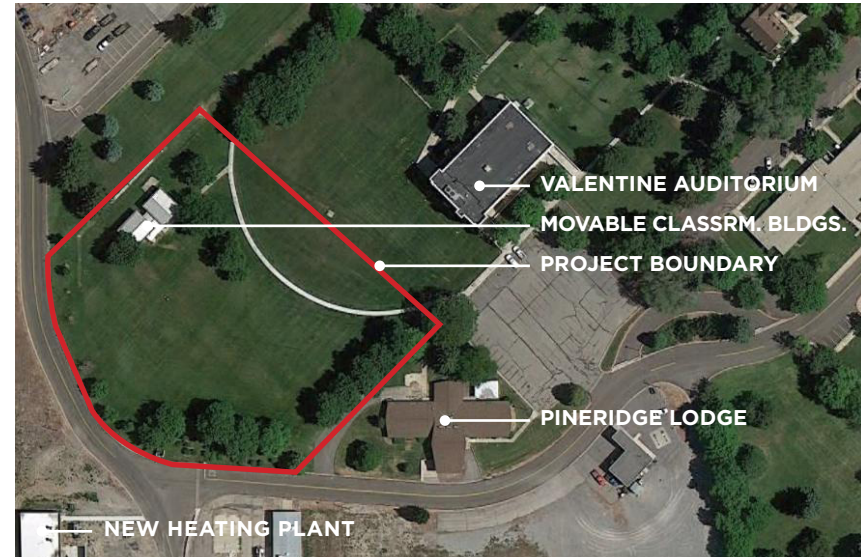
The project site was formerly occupied by a building identified as “Nursery.” It is understood that when the building was demolished, the footings and foundations remained and were buried on the site. The removal of the footings and foundations will be part of the Admissions and Safe Housing project.

Site Description

The site is relatively flat with prevailing drainage in the south and west directions. The average slope in this area is about 1 to 1.5% percent. The site is planted with turf, with mature trees on the southeast boundary and in the northwest corner.



Looking across the site from southeast to northwest



Extent and location of Nursery footprint on the project site

**West view****Northwest view****Northwest view toward the now demolished
Movable Classroom buildings****Northeast view toward the Valentine Auditorium****Mature trees along the southeast boundary****Mature trees along the south boundary**

Views

The site has unobstructed views of the Wasatch Mountains in the north (Lone Peak), east (Mount Timpanogos) and southeast. The southwest views are toward Utah Lake, over portions of American Fork and Pleasant Grove Cities. The building design team should strive to take advantage of these views, using them for residential pod main living and dining rooms views, if possible.

SITE NEEDS

Required Parking

Visitors: Four spaces, adjacent to the building

Staff: 30 spaces, in the designated area southeast of the project site.

Handicap/Accessible: Code-required quantity, adjacent to the building.

Reserved: Four spaces, adjacent to the building for: Nurse; Maintenance; State Vehicle; USDC Golf Cart. Golf cart space will require a 110 volt charging station.

Reserved, Carpool/Fuel-Efficient: Minimum of two parking spaces for carpool or fuel efficient, low-emitting vehicles; in preferred parking locations.

Auditorium Existing Parking Lot: The Auditorium parking lot can be used/shared by this facility, although there are times when the Auditorium lot will be heavily used.

Outdoor Recreation Area

Each residential pod will have a dedicated, controlled-access Outdoor Recreation Area. The area must be completely enclosed by the building structure or by security fencing with candy-cane style pickets, to contain the residents. The recreation area will be used by residents for sports, activity, eating, etc. The area must be 1,200 square feet minimum; approximately half the square footage will be concrete paving and half turf. The paved area must have a portion that is covered with a roof structure so that the outdoor yard can be used during the winter or inclement weather. The paved area should include a basketball standard.

The outdoor area must have lighting, as it will be used at all times of the day and night. It must have a security camera. It must also contain a designated smoking location that meets code requirements for distance from building entries.

The outdoor area must be designed and constructed for resident safety, similar to building interior Resident-Access Areas. It must be free of sharp or protruding edges, wires or other elements that could cause accidental or intentional injury.

Bicycle Storage

The project must include storage for ten staff or visitor bicycles. Options include: a rack adjacent to the building covered by a roof overhang; secure bicycle lockers; or another equivalent method as proposed during design.

Landscape Design

The landscape design must comply with the Landscape and Irrigation Standards defined in the DFCM Design Requirements, and the requirements of the High Performance Building Standard, 5.4 Site Design, found in Appendix B.

Service Access

The proposed site and building access will be from 800 East Street, 900 North Street and/or 980 North Street. One of these areas will serve as the ingress and egress for deliveries and waste disposal.

Fire lanes must be designed for H2O loading to accommodate fire apparatus as needed for building protection. This should be coordinated with the Utah State Fire Marshal in early design development. The service drives that continue to the existing buildings must also be sized for this heavy duty loading of delivery trucks and garbage trucks. During construction, the access to the various buildings surrounding the project must be kept open.

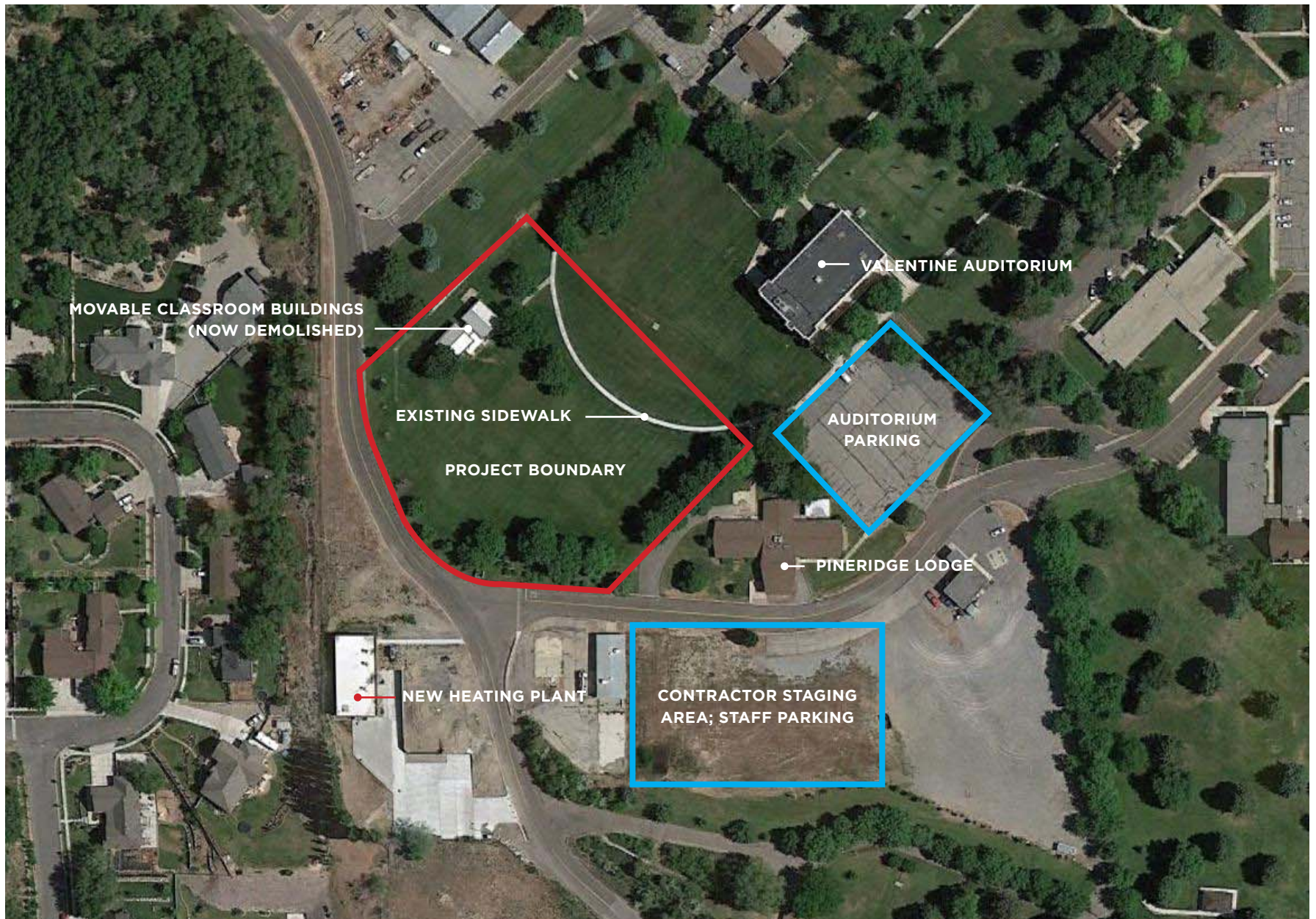
Construction Access and Staging

The project boundary is shown on page 2.7. All of the adjacent existing buildings must remain in operation with limited service interruptions while the new building is being constructed. This will require special care for the existing buildings and the utilities running to and from those buildings.

The area for contractor staging is across the street to the southeast. It must be fenced during construction. This will become the staff parking area upon construction completion.

A safe work site must be maintained at all times, with safe tool management, as well as proper fencing and access control. As part of the construction documents, the following areas of concern and priority should be discussed and solutions made available:

- The location and number of vehicles on the site pertaining to the construction of the project should be handled in a clean and orderly fashion. Possible shuttling of construction personnel should be considered due to the limited space for staging and parking of privately owned vehicles.
- Construction access and haul routes to the site must be planned.
- Continued safe access for pedestrians must be maintained.
- Fire truck access to the existing facilities and to the proposed facility must be maintained at all times.



DESIGN CRITERIA

Elevations

The elevation of the proposed structure will be set by careful coordination with the existing adjacent buildings. The lowest finish floor elevation must be considered with regard to the elevations of the existing drives so that the building is not flooded during a 100-year storm event. Care must be taken to set the proposed building elevation so that connections to any existing adjacent elements can be made without ramps.

The elevation of connection points to existing curb and gutter, walks and paving shall be verified by the design engineer. The building elevation must be set so that access to adjacent streets and pedestrian access can be maintained and connections to various buildings can be maintained.

Based on the relatively flat nature of the site, site retaining walls are not anticipated. If it is discovered in the design process that site retaining is needed, the design team shall coordinate the retaining wall design with the geotechnical engineer.

Seismic Design

The recommendations in the geotechnical report must be followed for seismic design. As part of the civil design, isolation valves in the water and gas lines should be installed at tees and connections, to allow damaged pipes to be shut off in case of damage from a large earthquake.

Open Space Emergency Access

Open space around the facility is critical for access, pedestrian egress, fire access, emergency vehicle access, and aesthetics. The proposed site should provide excellent access for all of the above, with proper design of site paving and walks.

Emergency access to the construction area and existing buildings must be maintained during construction.

State of Utah High Performance Building Standard

The State of Utah Division of Facilities and Construction Management (DFCM) requires that each state project meet a sustainable design and High Performance Building Standard. The updated version of the standard that is a requirement for this project is included in Appendix B.

Soils Report

A soils report for the Admissions and Safe Housing has been provided by the DFCM and is included in the program appendix. The soils report provides soil types and classifications, soil bearing pressures, existing and anticipated water tables, footing, slab and paving recommendations, site fill, compaction and gradation requirements and percolation rates.

The design team should consult the geotechnical engineer for additional recommendations and information sent subsequent to the report in the appendix.

Topographical Survey

A topographical survey for the project has been provided by the DFCM and is included in the program appendix.

Prior to beginning work on the project, the design engineer must obtain an electronic copy of the survey with spot elevations from DFCM or from the Utah State Developmental Center.

The design engineer must determine that sufficient topographical data is provided or perform their own topographical survey.

SITE UTILITIES

Relocations

There are several utilities that cross the project site. The design engineer needs to confirm with the Utah State Developmental Center which utility lines can be capped and eliminated and which utility lines must be relocated. Some of the lines in the proximity of the construction are fire sprinkler water lines, sewer lines, steam lines, fire alarm conduit, underground power lines and pressure irrigation. If the lines are to be capped, they should be capped at the main line connection where possible. The eliminated pipe line should be removed and the excavation backfilled with acceptable soils to not less than 95% compaction unless further excavation will take place. If the utility is to be relocated, the new utility lines must be installed and be commissioned prior to the old line being removed from service.

Culinary Water

An existing 4-inch fire sprinkler water line which runs northwest and southeast through the proposed site will need to be removed and possibly relocated. An existing 6-inch fire sprinkler water line running southwest and northeast near the north edge of the proposed site may need to be relocated.

The design engineer shall verify that the existing water system has sufficient pressure and flow for the proposed project. The engineer shall also show connections for water line looping. The design engineer shall provide to DFCM a copy of the fire flow model during schematic design that shows that this facility will have adequate fire protection. The existing water system is shown on the topographic survey.

Sanitary Sewer

An existing 12-inch sanitary sewer runs from the northwest to the southeast through the site and will need to be relocated around the proposed building. The depth of the primary sanitary sewer is currently unknown and not shown on the survey but should be field verified prior to setting the finished floor elevation of the proposed building.

Storm Drain

The current on-site storm drain system consists of a series of non-interconnected sumps. These sumps have functioned successfully historically. The geotechnical study provides soil profiles and it is likely that a sump centered solution will be adequate for the newly developed site. A percolation test will be requested as part of the soils investigation in the areas intended to become infiltration galleries, to obtain an accurate percolation rate for use in sump design.

Design, construct, and maintain storm water Best Management Practices (BMPs) that manage rainfall on site and prevent the off-site discharge of precipitation from the first one inch of rainfall from a 24-hour storm preceded by 48-hours of no measureable precipitation.

Implement at least two BMPs from the Best Management Practices for Storm Water from the Salt Lake County Engineering and Flood Control – Guidance Document for Storm Water Management – January 2012; Chapter 7 (www.slco.org/pweng/stormwater/pdf/longswplan.pdf):

- Provide two BMP Information Sheets from the Guidance Document and a description of how the specific BMPs are implemented in the project.
- Identify and describe the selected strategies in the OPR, and submit with the Design Development submission.
- Implement one additional site performance standard as identified in items 2 through 5 on page 7-4 of the Storm Water Management Guidance Document.

As part of the design, the engineer shall verify that the proposed design meets the requirements of DFCM and American Fork City.

Irrigation Lines

There are several irrigation lines that service the landscape areas around the project. The landscape design architect shall verify what irrigation lines can be capped and which irrigation lines shall be relocated. He shall coordinate this information with the civil engineer. In addition to the irrigation lines, there are a number of irrigation components such as control boxes and control wires. The landscape design architect shall coordinate with the Utah State Developmental Center regarding the demolition, location and relocation of any control boxes and control wires. This information shall be coordinated with the civil engineer.

Gas Lines

There is a 6-inch high pressure gas line feeding the Heating Plant just southwest of the proposed site with 2-inch gas lines located at the south and west of the site. There do not appear to be individual gas lines going to adjacent buildings as these buildings are currently heated with steam. The mechanical and civil engineer should coordinate with Utah State Developmental Center to determine if gas is needed for the proposed building. It is anticipated that the heating for the building will be from the central plant.

Site Electrical and Telecommunications

See the Section 5 electrical narrative for site electrical and telecommunications. The site civil shall coordinate the locations of site electrical equipment and routing with the electrical engineer.

3 | BUILDING CRITERIA

BUILDING CRITERIA

FACILITY FUNCTIONS

The Admissions and Safe Housing facility will provide space for two primary functions on the USDC campus: 1) the Utah State Developmental Center admissions process and 2) housing for 36 residents, designed for a high level of safety and durability.

Admissions

Currently spread among four USDC facilities, the admissions process will be consolidated in a single location in the new Admissions and Safe Housing building.

The admissions process typically includes a meeting attended by the prospective resident, family members or guardians, medical staff, and administrative staff. The process also includes a brief medical/health exam. These events are followed by resident move-in to housing where they will remain during an assessment period that lasts up to several weeks.

Safe and Durable Housing

There is a broad range of housing types and levels available on the USDC campus to meet the varying needs of the residents. The new Admissions and Safe Housing facility will provide the Center with its safest and most durable housing, in order to serve these groups:

- **New Residents.** Newly admitted residents will stay in the Admissions and Safe Housing building while they undergo assessment by USDC staff as to which long-term USDC housing option is most appropriate to their level of need.
- **Residents with Aggressive Conditions.** USDC residents with more aggressive conditions will reside long-term in this facility, which will be designed and constructed to meet their specific needs.

The majority of the residents of the new facility will be between the ages of 18 and 26. Male and female residents will occupy separate residential pods. A preliminary plan is to use the three pods for these population groups: 1) young males, 2) older males and 3) females.

Because some of the residents may try to leave, the facility must be designed to contain the residents, with controlled entry and exit for each residential pod.

Staff Offices and Support Space

In addition to admissions and safe housing, the facility will contain office and support space for the staff who work in the building. There will be approximately 25 staff members working on a shift.

ORGANIZATION & CONFIGURATION

Overall Building Adjacency Diagram

The new facility is anticipated to be a single story.

The diagram on the facing page illustrates the desired relationship between the major program components. Although the residential pods will have controlled entry and exit, the overall building must be designed so that the Central Core has a good connection with each of the pods, providing convenient access back and forth for staff and residents. The following Central Core spaces will be accessed by residents (accompanied by staff), so have particular need for an easy pathway to the pods: A103 Visiting Room; A206 Therapist; and A401 Classroom.

See Section 4 for more information about space relationships and adjacency needs.

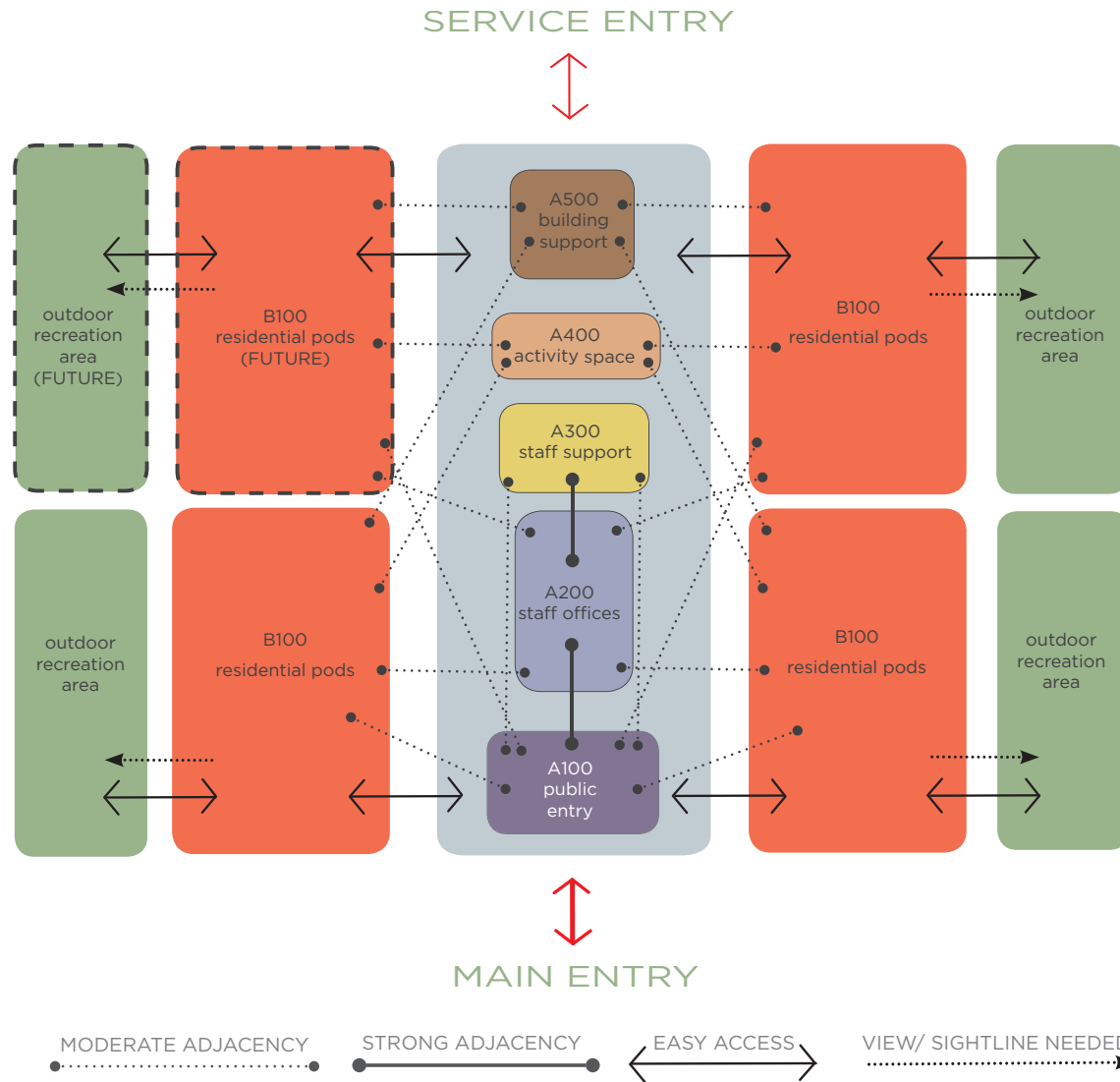
Future Addition

The USDC is anticipating adding a fourth residential pod to the facility in the near future, as funding becomes available. The current project must be planned and configured for the easy and effective addition of another pod.

In addition to the building layout, the facility systems must be designed and constructed with sufficient capacity for the future additional residential pod.



OVERALL BUILDING DIAGRAM



EXTERIOR MATERIALS & DESIGN

Facility Identity

Because the admissions functions for the Utah State Developmental Center will take place in the Admissions and Safe Housing facility, this building will form the initial impression of the USDC for many visitors and residents. The building should provide a welcoming, pleasant and non-institutional appearance, in order to ease what is a difficult experience for many.

Walls

To fit within the context of the USDC campus and also to suit the requirement for durability, safety and easy maintainability, the exterior of the building must be of unit masonry construction – brick or decorative concrete block. The majority of the existing residential and treatment buildings on the USDC are brick, although some more recent buildings are constructed of concrete block.

Roof Materials & Form

The design team will determine whether the roof form is sloping or flat. Existing USDC campus buildings contain both forms.

Roofing must comply with the DFCM Design Requirements (2009). Acceptable materials include:

- sloping roofs: 40-year asphalt shingles with full underlayment or standing seam of prefinished metal
- flat roofs: 80-mil thick PVC membrane with 30-year warranty and 90 mph wind rider

Windows

Exterior windows must have commercial grade, thermally-broken aluminum frames. Depending on the facility design, the windows could be individual units, stick-built storefront systems, or a mix of the two.

Metal Elements

Exterior metal elements, such as canopy structural elements, trim, fascia, rainwater management systems, etc., must be anodized aluminum, coil-coated steel, galvanized steel, or a material of equivalent durability and maintainability as approved by the Owner during the design process; finished with 3-coat fluoropolymer coating.



Pineridge Lodge - buff brick



Valentine Auditorium - buff brick



New heating plant - decorative concrete block

INTERIOR FINISH & MATERIAL CONSIDERATIONS

The comfort and safety of the residents and staff are of critical importance in the design of the Admissions and Safe Housing facility. Interior materials and finishes in the resident-access spaces must be selected with strong consideration for safety, durability and ease of cleaning and maintenance, as well as attractiveness and their contribution toward a pleasant and comfortable environment.

Elements and materials must not have sharp edges or corners; for example, concrete block or other hard-surfaced materials must have bullnose or rounded corners and edges, in order to prevent intentional or accidental injury.

Materials and finishes must be able to withstand the high level of abuse that may occur in this facility. They should not have elements that can be broken off and used to harm oneself or others. Elements that can be removed, such as rubber wall base, should not be used.

Surfaces and materials must be easily washable and easy to maintain. They must be durable enough to withstand numerous repeated washings and cleanings; for example, epoxy paint should be used in areas that will be accessed by residents.

RESIDENT AREA PLANNING & DESIGN CONSIDERATIONS

Doors and Door Hardware

Some rooms must have doors that swing out, as noted in the Section 4 room data sheets and diagrams. This is a safety feature to discourage barricading by residents.

The building's steel doors must be 14 gauge steel, reinforced, with 14 gauge, seamless steel frames. Doors in Resident-Access Areas must have continuous hinges with an anti-ligature design. Door closers in these areas must be integral to the door panel, or installed on and visible only from the corridor side. Door handles in Resident-Access Areas must have an anti-ligature design.

Doors connected to the fire alarm system must be a fail-secure type. All doors in the building must lock. Keys must be compatible with the USDC existing keying system, to be coordinated during design.

Door locksets must have rim housings with figure-eight cores. Door hardware in Resident-Access Areas must be medium security grade.

Windows and Mirrors

Windows and glazing in all areas of the building accessed by residents must be polycarbonate or an equivalent non-breakable material. Exterior glazing will require a polycarbonate panel added to the resident-access side, whether interior or exterior (as in the Outdoor Recreation Area).

All windows must have blinds or coverings to allow visual privacy and control of glare. In all areas of the building accessed by residents, the coverings must be enclosed by the glazing to prevent damage.

Mirrors in all areas accessed by residents must be of unbreakable material (polycarbonate, stainless steel, chrome-plated steel, specialized glass, etc.).

Toilet and Shower Rooms

Toilet and shower rooms in Resident-Access Areas must have suicide-resistive elements such as fixtures that cannot provide a ligature attachment opportunity. Grab bars must be of anti-ligature design. Piping below sinks must be enclosed by construction that is inaccessible to patients, for example, a cabinet with a durable plastic facing constructed with tamper-proof screws.

Fixtures, Fittings and Equipment

In all areas of the building accessed by residents, all fixtures and fittings (including but not limited to electrical, lighting, fire alarm and mechanical) must be flush-mounted or recessed so they cannot be grabbed and broken off by residents. Keyed fire alarm pull stations are required.

All equipment in resident spaces must be tamper-resistant, have polycarbonate rather than glass elements, and incorporate specialized safety and security features that will discourage vandalism or injury to self and/or others. Mechanical fasteners must be tamper-resistant. Light fixtures must not allow access to lamps.

All fixtures, millwork and equipment must be of heavy-duty construction and securely attached/bolted to walls, floors and ceilings. Furniture items must either be attached to the building structure, or be sufficiently heavy (i.e. sand-ballasted) so that residents cannot pick up, move or use them as a weapon. All must be very sturdy and easily cleaned. The majority of drawers and cabinets must be locking (locking cabinets to be confirmed with staff during design) and cabinet pulls must be recessed or of a closed type.

Ceilings

High ceilings in all areas accessed by residents are desirable, in order to prevent residents from damaging the surfaces or tampering with ceiling-mounted fixtures and elements. For this reason, the minimum ceiling height throughout the building is 9'-6". A ceiling height of minimum 1-1/2 stories is required for the residential pod living and dining areas, to give a sense of space and openness, in addition to increasing safety and damage-resistance.

HEALTH CARE FACILITY CRITERIA

The *Guidelines for Design and Construction of Health Care Facilities* requires toilet and bathing rooms in nursing care facilities to be accessed directly from patient rooms. In the Admissions and Safe Housing facility, it will be necessary that toilet and bathing rooms are accessed directly from the hallway and that access doors are easily visible by staff, for resident safety and security. During programming, the Utah Department of Health representative who reviews health care facility plans indicated that a variance would be granted for this requirement, if requested during design.

Design Review

The facility design and construction documents will require review and approval by the Department of Health. It is highly recommended that early conversations with the reviewer take place, in order to assure a smooth approval process when the documents are complete. In particular, timely development and submission of a Functional Program, required by Utah Administrative code R432-4-14 and 15, will be helpful in facilitating the review process.

SAFETY, SECURITY & DURABILITY LEVELS

There are three levels of safety and durability needs identified in the program, defined below with a description of requirements. The level required for each space is noted in the Section 4 individual room data sheets.

Resident-Access Areas. *Defined as resident living spaces, where residents will at times be unaccompanied or out of sight of staff.*

Requirements for all elements, including fixtures, fittings, finishes, equipment, furnishings, etc., include:

1. Suicide-resistive, non-ligature design.
2. Tamper-proof, with a high level of durability equivalent to that used in medium security facilities.
3. Easily cleanable.
4. Highly durable; able to withstand repeated cleanings.
5. Glazing that is non-breakable or faced with non-breakable material such as polycarbonate.

Accompanied Areas. *Defined as areas that residents will access only when accompanied by staff or family members.*

These spaces require:

1. Hardened, durable finishes and elements.
2. Fixtures and fittings that are flush-mounted or recessed.
3. Glazing that is non-breakable or faced with non-breakable material such as polycarbonate.

These spaces do not require suicide-resistive, non-ligature, medium security or tamper proof designs or elements.

Non-Resident Areas. *Defined as spaces that will be accessed only by visitors or facility staff; residents are not anticipated to access these areas.*

These spaces do not have unusual security or durability considerations and can receive typical office/housing facility materials and finishes.

General Building Areas that May be Accessed by Residents. The Section 4 individual room data sheets identify some rooms that "will not be accessed by residents but this general building area may be accessed by residents." The degree of hardened finishes required for these areas will be determined during design and will depend on the layout and possibility of resident access. If the general area where a Non-Resident room is located will be accessed by residents, the finishes, materials, fixtures and equipment in the general area outside of the room must be equivalent to those required for Accompanied Areas. This guideline applies to the need for a room to have a steel door rather than a wood door.



FINISH/SAFETY REQUIREMENTS

Finish and safety requirements for the three levels of durability and safety are summarized here.

RESIDENT-ACCESS AREAS

Flooring

Stained concrete
Ceramic tile
Seamless rubber
VCT*

Walls

Concrete block, painted
Hardened gypsum board, painted*

Ceiling

Hardened gypsum board, painted
Lay-in acoustic tile*

Suicide-Resistive/Anti-Ligature

Required

Tamper-Resistive/Medium Security

Required

High Durability/Easily Cleaned

Required

ACCOMPANIED AREAS

Flooring

Stained concrete
Ceramic tile
Carpet
VCT*

Walls

Concrete block, painted
Concrete block, decorative, honed
Hardened gypsum board, painted*

Ceiling

Hardened gypsum board, painted
Lay-in acoustic tile*

Suicide-Resistive/Anti-Ligature

Not required

Tamper-Resistive/Medium Security

Not required

High Durability/Easily Cleaned

Required

NON-RESIDENT AREAS

Flooring

Stained concrete
Ceramic tile
Carpet
VCT*

Walls

Concrete block, painted
Concrete block, decorative, honed
Gypsum board, painted*

Ceiling

Gypsum board, painted
Lay-in acoustic tile

Suicide-Resistive/Anti-Ligature

Not required

Tamper-Resistive/Medium Security

Not required

Standard Durability & Cleanability

Required

*Acceptable only as noted in room data sheets

BUILDING PERFORMANCE

State of Utah High Performance Building Standard

The State of Utah DFCM is finalizing a new High Performance Building Standard (HPBS) that will be used on all state projects. Admissions and Safe Housing is required to adhere to the new standard. The standard has been modified to be appropriate for this project size and delivery method (\$5 million, design-build) by programming team members and DFCM energy, commissioning, and exterior envelope consultants. The new HPBS, specific to this project, is located in Appendix B.

The HPBS requires development of an Owner Project Requirements (OPR) document during programming for design-build projects. The OPR for Admissions and Safe Housing is located in Appendix A. The project must meet the requirements of the OPR.

Daylight & Views

Daylight and exterior views are desired for as many of the building's interior spaces as is feasible. The data sheets for each space identify the priority for daylight for each space.

Exterior Envelope

The requirements for the facility's exterior envelope design are contained in the High Performance Building Standard, Appendix B.

Energy Efficiency

The elements and strategies for the facility's approach to energy efficiency are addressed in the High Performance Building Standard, Appendix B.



FURNISHINGS, FIXTURES & EQUIPMENT

Items Provided by Contractor from Construction Budget

The following FF&E items must be provided by the Contractor.

Residential Appliances

- Refrigerator
- Microwave
- Electric Range/Oven
- Dishwasher
- Clothes Washer
- Clothes Dryer (electric)

Window Coverings

- Exterior Windows
- Interior Windows/Sidelight

Millwork

- Cabinets
- Resident Bedroom Closet
- Changing Bench
- Resident Area Game/DVD Cabinet
- Break Room Coat Rod/Shelf

Specialties

- Lockers
- Emergency Shower/Eyewash Station
- Custodial Mop & Broom Rack

Toilet and Shower Room Accessories, Non-Secure

- Grab Bars
- Mirror
- Soap Dispenser
- Paper Towel Dispenser
- Toilet Tissue Dispenser
- Toilet Seat Cover Dispenser
- Sanitary Vendor
- Sanitary Receptacle
- Waste Receptacle
- Robe Hook
- Shower Rod with Curtain

Toilet and Shower Room Accessories, Secure/Resident Areas

- Grab Bars
- Mirror
- Soap Dispenser
- Paper Towel Dispenser
- Toilet Tissue Dispenser
- Waste Receptacle
- Robe Hook

Security & Access-Control Equipment & Systems

- Entry Access/Intercom
- Card Reader Entry
- Duress Alarm
- Security Cameras, Monitors & Recording Devices

Items Provided by the State/USDC from FF&E Budget

The following items will specified and purchased directly by the State and USDC. Installation will be the responsibility of the State/USDC rather than the contractor.

Furnishings

- Office furniture (desks, systems furniture workstations, seating, bookcases, file cabinets, storage bins & drawers)
- Conference room furniture
- Resident area furniture (beds, lounge seating and tables, dining tables/seats,)
- Storage room shelving and cabinets

Equipment

- Office and conference room equipment (computers, telephones, copier/ printers, TV/monitors & controls, videoconferencing equipment)

Miscellaneous Items

- White boards and tack boards
- Waste & recycling receptacles
- Soiled & clean linen carts
- Housekeeping carts

CODE & STANDARDS

Applicable Codes

1. 2012 edition of the International Building Code (IBC), to include Appendix J, issued by the International Code Council.
2. 2011 edition of the National Electrical Code (NEC), issued by the National Fire Protection Association.
3. 2012 edition of the International Plumbing Code (IPC), issued by the International Code Council.
4. 2012 edition of the International Mechanical Code (IMC), issued by the International Code Council.
5. 2012 edition of the International Residential Code (IRC), issued by the International Code Council.
6. 2012 edition of the International Energy Conservation Code (IECC), issued by the International Code Council/ASHRAE 90.1 2010
7. 2012 edition of the International Fuel Gas Code (IFGC), issued by the International Code Council.
8. Utah State Amendments, which can be found on the DFCM website: http://dfcm.utah.gov/downloads/bldg_official/codes_in_use.pdf

Standards & Guidelines

DFCM Standards

Design Process, web address:

http://dfcm.utah.gov/downloads/design_manual/design_process.pdf

DFCM Design Requirements, June 11, 2009, web address:

http://dfcm.utah.gov/downloads/design_manual/design_requirements.pdf

Utah State Space Standards, August 1994

Agency Standards

Utah Administrative Code R432, State of Utah Health Facility Rules

Guidelines for Design and Construction of Health Care Facilities, The Facility Guidelines Institute, 2010 Edition; Parts 1, 4 and 6

Health Care Facility Agency Review

Facility design and any requested variances will require review and approval by:

Utah Department of Health

Family Health and Preparedness, Licensing

Cannon Health Building

288 North 1460 West

Salt Lake City, Utah 84116-3231

Andrew Baxter (801) 538-6140 andrewbaxter@utah.gov

Facility Classification

This building is classified as an Intermediate Care Facility for Individuals with Intellectual Disabilities (ICF/IID)

Building Occupancy

Under the 2012 IBC, the building will be classified as an Institutional Group I-2 occupancy. This group includes: "buildings and structures used for medical care on a 24-hour basis for more than five persons who are incapable of self-preservation."

Building Type/Allowable Area & Height

The building construction type and allowable area and height will be determined during design. The facility will be required to have non-combustible construction.



4 | DETAILED SPACE NEEDS

SECTION 4 CONTENTS

Section 4 contains information regarding the detailed space needs for the new Admissions & Safe Housing facility. The first several pages contain project summary information and the space list spreadsheet for the project. These are followed by sub-sections for each space grouping, describing the detailed needs for that group using narrative, adjacency diagrams, and individual room data sheets and diagrams.

PROJECT SUMMARY

The chart on the facing page is a summary of the overall project square footage needs and costs.

The facility will be built with three residential pods of 12 beds each, or 36 total beds. It is anticipated that funding will be available in the near future to construct a 4th residential pod, for a total of 48 beds. The summary page shows the totals for both the three-pod and four-pod buildings.

The immediate project that will have three pods (36 beds) must be planned to accommodate the fourth pod. Building systems must be designed with the capacity for the additional residential pod.

AREA CALCULATIONS

The Utah State Space Standards were used as much as possible in determining program net areas amounts; these net areas form the basis of the program space list represented in this section. Each net area is multiplied by a Wall/Circulation Factor to account for the walls that surround the space and the circulation space needed to access it. The factor ranges from 1.25 to 1.40, varying according to the size of the net space. The resulting Department Gross Square Feet, or DGSF, is used in planning. The DGSF is multiplied again by a Building Grossing Factor, which accommodates space needed for major circulation paths, mechanical and electrical space, exterior walls etc., and results in building gross square feet (GSF). A Building Grossing Factor of 1.19 was used in this program. The overall building efficiency (NSF/GSF) is 64%.

PROJECT COSTS

Conceptual costs for each space are shown in the two right-hand columns. They are based on construction cost/GSF, and were used during programming to balance the program with the project budget.

The project construction cost budget was established at \$5,228,223 prior to programming. The USDC had the goal of constructing four residential pods (48 total beds). Conceptual cost estimating during programming determined that it would only be possible to construct three pods of housing, or 36 beds, within the budget amount. The project Core Team decided to proceed with the project at three residential pods, with the three-pod facility designed and planned to accommodate the addition of the fourth pod in the near future.

SAFETY, SECURITY AND DURABILITY REQUIREMENTS

The safety, security and durability level required for an individual space is denoted by its room data sheet identification as a “resident-access”, “accompanied” or “non-resident” area. See program Section 3 for a description of the requirements for the different designations.

PROGRAM COMPONENTS

The Building Summary chart on page 4.4 shows a breakdown of the functional space categories for the Admissions and Safe Housing facility, which is comprised of these elements:

Central Core. These are spaces that support the residential pods and the facility’s staff. The Central Core has five sub-categories, which include public spaces, staff offices, staff support space, activity spaces and building support spaces.

Residential Pods. The facility will have three identical residential pods, each housing twelve residents. The Building Summary chart shows the square footage and cost amounts for a single residential pod, as well as the total for three pods (which will be constructed by the current project) and four pods (the future total when a fourth pod is added to the facility).



PROJECT SUMMARY

		Square Footage			Construction Cost	
		NSF	DGSF	GSF	Total Cost	Cost/GSF
FACILITY COMPONENTS						
A	Central Core	2,984	3,979	4,735	\$919,199	\$194
B	3 Pods (36 Beds)	11,088	14,634	17,415	4,244,034	\$244
B	4 Pods (48 Beds)	14,784	19,512	23,219	5,658,712	\$244
BUILDING TOTAL - 3 PODS		14,072	18,613	22,149	\$5,163,233	\$233
BUILDING TOTAL - 4 PODS		17,768	23,491	27,954	\$6,577,910	\$235
Building Grossing Factor		1.19				
Building Efficiency (Net/Gross Ratio)		64%				
SITE PREPARATION COST						
C	Site Prep: Removal of existing footings & foundations				\$65,000	
TOTAL CONSTRUCTION COST - 3 PODS + SITE PREP					\$5,228,233	\$236
TOTAL CONSTRUCTION COST - 4 PODS + SITE PREP					\$6,642,910	\$238
Project Construction Budget:					\$5,230,871	

Square Footage Definitions

NSF: Net Square Feet, or the space inside surrounding walls or furniture panels.

Wall/Circulation Factor: Factor for area needed for surrounding walls & immediate circulation to a space.

DGSF: Department Gross Square Feet, or NSF plus area needed for surrounding walls & immediate circulation.

Building Grossing Factor: Factor for area needed for building common spaces (major circulation, mechanical/ electrical rooms, exterior walls, etc.). Factor used in this program = 1.19.

GSF: Gross Square Feet, or total building area measured from outside surfaces of exterior walls (GSF = DGSF x Building Grossing Factor).

BUILDING SUMMARY

		Square Footage			Construction Cost	
		NSF	DGSF	GSF	Total Cost	Cost/GSF
A	CENTRAL CORE	2,984	3,979	4,735	\$919,199	\$194
A100	Public Entry	374	503	599	\$134,088	\$224
A200	Staff Offices	1,380	1,835	2,184	\$403,589	\$185
A300	Staff Support	540	722	860	\$181,627	\$211
A400	Activity Space	220	293	348	\$62,991	\$181
A500	Building Support	470	625	744	\$136,904	\$184
B	RESIDENTIAL PODS					
	3 PODS (36 Beds)	11,088	14,634	17,415	\$4,244,034	\$244
	4 PODS (48 Beds)	14,784	19,512	23,219	\$5,658,712	\$244
B100	1 Pod (12 Beds)	3,696	4,878	5,805	\$1,414,678	\$244
	3 Pods (36 Beds)	11,088	14,634	17,415	\$4,244,034	\$244
	4 Pods (48 Beds)	14,784	19,512	23,219	\$5,658,712	\$244
BUILDING TOTAL: 3 PODS (36 Beds)		14,072	18,613	22,149	\$5,163,233	\$233
BUILDING TOTAL: 4 PODS (48 Beds)		17,768	23,491	27,954	\$6,577,910	\$235



A. CENTRAL CORE

		Space Qty.	NSF/ Space	Total NSF	Wall/ Circ. Factor	DGSF	GSF	Cost/ GSF	Cost
A100	PUBLIC ENTRY			374		503	599	\$224	\$134,088
A101	Lobby/Waiting	1	130	130	1.33	173	206	\$190	\$39,093
A102	Rest Room	2	42	84	1.40	118	140	\$335	\$46,881
A103	Visiting Room	1	160	160	1.33	213	253	\$190	\$48,114
A200	STAFF OFFICES			1,380		1,835	2,184	\$185	\$403,589
A201	Secretary/Reception	1	120	120	1.33	160	190	\$235	\$44,632
A202	Unit Director	1	120	120	1.33	160	190	\$180	\$34,186
A203	QIDP	2	120	240	1.33	319	380	\$180	\$68,373
A204	RN3	1	120	120	1.33	160	190	\$180	\$34,186
A205	Charting Room	1	150	150	1.33	200	237	\$180	\$42,733
A206	Therapist	1	150	150	1.33	200	237	\$180	\$42,733
A207	Behaviorist	1	120	120	1.33	160	190	\$180	\$34,186
A208	Social Work	1	120	120	1.33	160	190	\$180	\$34,186
A209	Rec Therapy/Activity	1	120	120	1.33	160	190	\$180	\$34,186
A210	Building Coordinator	1	120	120	1.33	160	190	\$180	\$34,186

A. CENTRAL CORE

		Space Qty.	NSF/ Space	Total NSF	Wall/ Circ. Factor	DGSF	GSF	Cost/ GSF	Cost
A300	STAFF SUPPORT			540		722	860	\$211	\$181,627
A301	Conference Room	1	240	240	1.33	319	380	\$190	\$72,171
A302	Staff Lounge	1	240	240	1.33	319	380	\$200	\$75,970
A303	Staff Shower	1	60	60	1.40	84	100	\$335	\$33,487
A400	ACTIVITY SPACE			220		293	348	\$181	\$62,991
A401	Classroom	1	120	120	1.33	160	190	\$190	\$36,086
A402	Rec/Activity Storage	1	100	100	1.33	133	158	\$170	\$26,906
A500	BUILDING SUPPORT			470		625	744	\$184	\$136,904
A501	Soiled Linen Pickup	1	100	100	1.33	133	158	\$170	\$26,906
A502	Storage, Clean Linen	1	100	100	1.33	133	158	\$185	\$29,280
A503	Storage, General	1	150	150	1.33	200	237	\$180	\$42,733
A504	Service Staging	1	120	120	1.33	160	190	\$200	\$37,985
A. CENTRAL CORE				2,984		3,979	4,735	\$194	\$919,199



B. RESIDENTIAL PODS

		Space Qty.	NSF/ Space	Total NSF	Wall/ Circ. Factor	DGSF	GSF	Cost/ GSF	Cost
B100	1 POD (12 BEDS)			3,696		4,878	5,805	\$244	\$1,414,678
B101	Bedroom	12	102	1,224	1.33	1,628	1,937	\$255	\$493,992
B102	Toilet Room	2	45	90	1.40	126	150	\$400	\$59,976
B103	Shower/Tub Room	2	80	160	1.40	224	267	\$370	\$98,627
B104	Living Room	1	630	630	1.25	788	937	\$215	\$201,482
B105	Electronics Area	1	100	100	1.33	133	158	\$215	\$34,028
B106	Dining Room	1	525	525	1.25	656	781	\$210	\$163,997
B107	Kitchen	1	215	215	1.33	286	340	\$215	\$73,160
B108	Resident Laundry-Washers	1	80	80	1.40	112	133	\$180	\$23,990
B109	Resident Laundry-Dryers	1	80	80	1.40	112	133	\$180	\$23,990
B110	Emergency Shower/Eyewash	1	30	30	1.40	42	50	\$200	\$9,996
B111	Program Lead	1	80	80	1.40	112	133	\$200	\$26,656
B112	Staff Rest Room	1	42	42	1.40	59	70	\$335	\$23,441
B113	Pod Storage	1	120	120	1.33	160	190	\$185	\$35,136
B114	Resident Storage	1	80	80	1.40	112	133	\$200	\$26,656
B115	Medications	1	100	100	1.33	133	158	\$210	\$33,237
B116	Time-Out Room	1	80	80	1.40	112	133	\$235	\$31,321
B117	Custodial Closet	1	60	60	1.40	84	100	\$190	\$18,992
B118	Outdoor Recreation Area	1	1,200					\$30	\$36,000
B100	3 PODS (36 BEDS):			11,088		14,634	17,415	\$244	\$4,244,034
B100	4 PODS (48 BEDS):			14,784		19,512	23,219	\$244	\$5,658,712

A. CENTRAL CORE | A100 PUBLIC ENTRY

The Public Entry component is the point of access for staff and visitors to the facility. The program does not designate a separate staff entry; it is anticipated that all people accessing the facility, with the exception of service deliveries and pick-ups, will use the public entry.

Hours of Operation

A101-102: 24-hour, 7 days per week
A103: 8 AM-9 PM, 7 days per week

Security

During business hours (8 AM – 5 PM), the public entry door will be unlocked, with open access to staff and visitors. The adjoining Rest Rooms and Visitor Room will also have open access to visitors during this time. After business hours, staff will use card keys to access the entry, and visitors will use a call button/telephone system to access the USDC switchboard for staff assistance to gain access to the facility.

The facility will have controlled access to spaces beyond the Public Entry grouping, with visitors gaining access from facility staff.

Functions

A101 Lobby/Waiting is the facility entry point for staff and visitors to the facility, including people who are visiting residents, participating in an admissions process, attending meetings in the facility, etc.

A102 Rest Room (Men’s and Women’s) are single-user toilet rooms that will be used by facility visitors and staff who work in the adjacent staff office area. (Each residential pod will contain a staff rest room for staff working in the pod.)

Location/Adjacencies

The public entry must be easy for first-time facility visitors to locate and identify. As the public face of the facility and the first impression that visitors and future residents will make, it must have an inviting and friendly appearance.

The Lobby/Waiting must be immediately accessed upon entering the building. This space will be monitored by the Secretary/ Reception staff position which will be directly adjacent, separated by a transaction window.

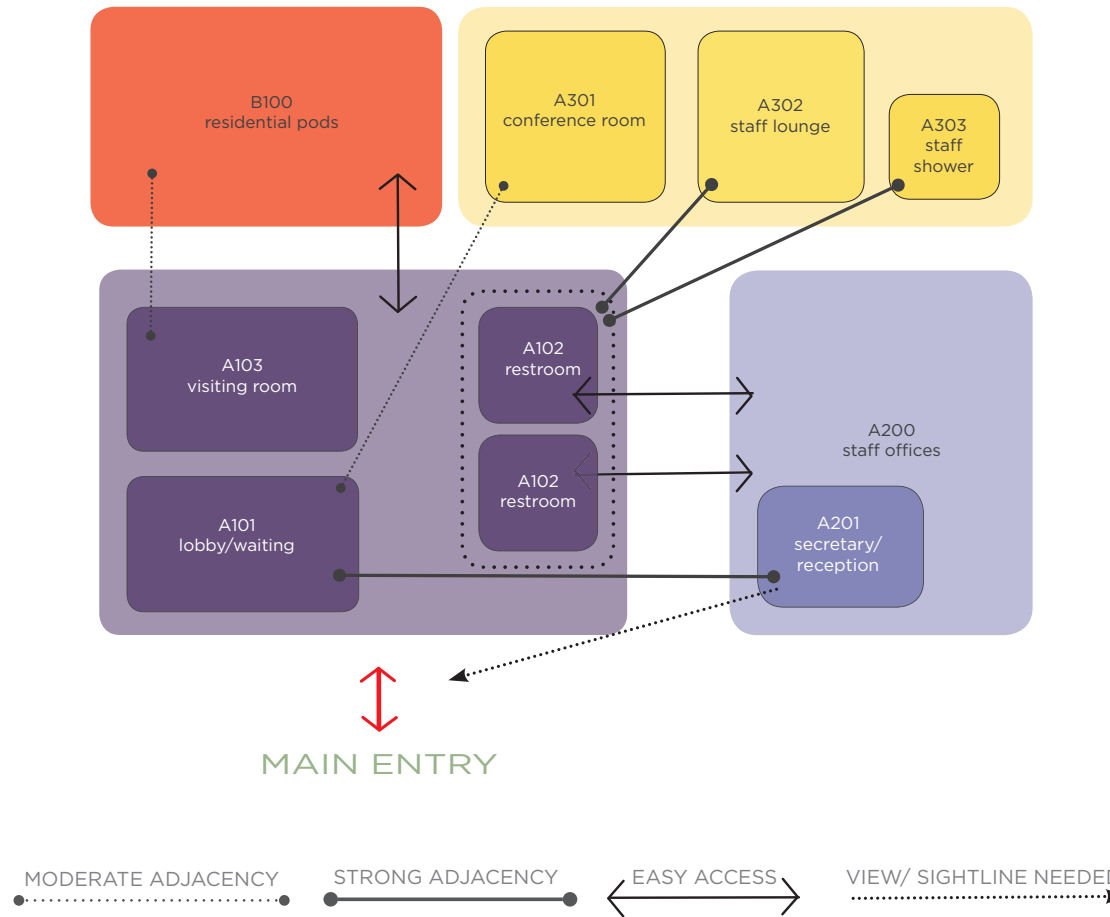
The Rest Rooms must be easily accessible by facility visitors and also by staff who work in the adjacent staff offices. Although easily accessed, the rest rooms must have a visually private entry point.

The Visiting Room will be used by people visiting residents of Admissions and Safe Housing. This space must be easily accessed by both the public entry spaces as well as the residential pods. This room should have a high level of sound separation from adjoining spaces.

A. CENTRAL CORE						
		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
A100	PUBLIC ENTRY			374	503	599
A101	Lobby/Waiting	1	130	130	173	206
A102	Rest Room	2	42	84	118	140
A103	Visiting Room	1	160	160	213	253



A100 PUBLIC ENTRY



A101 LOBBY/WAITING

AREA: 130 NSF

Space Quantity: 1

Occupants: Up to 6 people

Function: Public & primary building entry to Admissions/
Safe Housing facility. Grouped with Rest Rooms
& Visiting Room-controlled access beyond
Visitor check-in & waiting space

Adjacency: Accessed from visitor parking & entry vestibule
Directly adjacent to Secretary/Reception
Easy access to staff offices & residential pods

Environment:

Floor: Stained concrete or ceramic tile in traffic areas;
carpet in waiting seating area

Walls: Decorative CMU, honed

Ceiling: Lay-in acoustic tile & painted gypsum board; 9-6'
height

Windows: Exterior windows desired
Interior sliding transaction window at Secretary/
Reception

Door: Storefront entry doors at vestibule, locking

Equipment: Entry access-control station (with speaker) in
vestibule, connecting to Secretary/Reception
area or Developmental Center switchboard
Security camera (at entry/access control station)

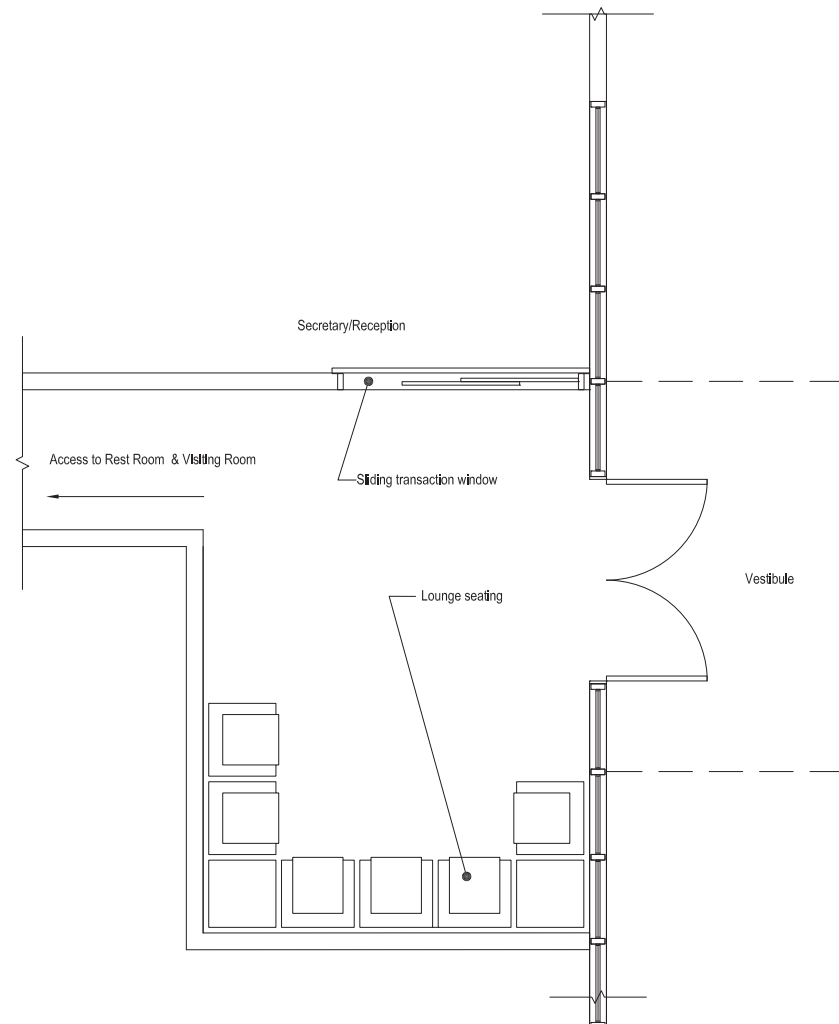
Furnishings: Lounge seating, occasional tables (6 seats)

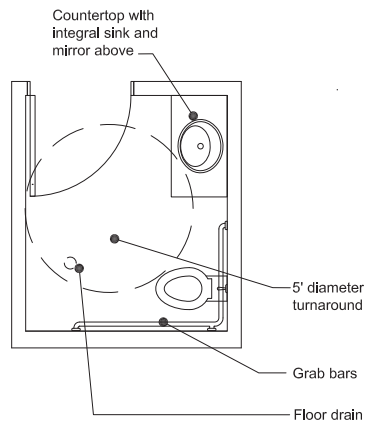
Mechanical: Dedicated HVAC zone. HVAC to design
conditions

Plumbing: None

Electrical: Duplex electrical outlets
Indirect fluorescent lighting, premium efficiency
Card reader at entry door for after-hours access

Notes: Residents will access space accompanied by
staff/family





A102 REST ROOM

AREA: 42 NSF

Space Quantity: 2

Occupants: 1 person

Function: Single-user toilet rooms (Men's & Women's) for shared use by staff & visitors

Adjacency: Visually private entry point adjacent to Lobby/Waiting & Staff Offices access

Environment:

Floor: Stained concrete or ceramic tile

Walls: Ceramic tile/painted gypsum board

Ceiling: Painted gypsum board; 9' height

Windows: None

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Solid-surface countertop with integral sink, with wall-mounted mirror above
Grab bars; soap, paper towel & toilet tissue dispensers

Furnishings: None

Mechanical: Exhaust HVAC to design conditions

Plumbing: Wall hung vitreous china water closet with manual shut-off valve; 0.5 GPM lavatory faucet; floor drain; concealed hose bibb

Electrical: Duplex electrical outlets, GFI
Electrical outlet at countertop, GFI
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family

A103 VISITING ROOM

AREA: 130 NSF

Space Quantity: 1

Occupants: Resident & family members (up to 6 people)

Function: Enclosed room for resident-family visits

Adjacency: Adjacent to public entry & Lobby/Waiting
Easily accessed from residential pods

Environment:

Floor: Carpet

Walls: CMU, painted

Ceiling: Painted gypsum board; 9'-6" height

Windows: Exterior windows/natural light desired
Entry door sidelight

Door: 3' x 7' steel door, locking

Equipment: None

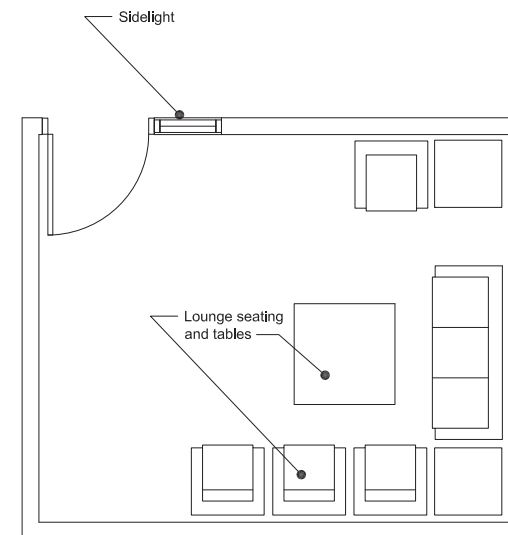
Furnishings: Lounge seating for 6 with occasional tables

Mechanical: Dedicated HVAC zone, HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
LED lighting, continuous dimming

Notes: Residents will access space accompanied by staff/family



A. CENTRAL CORE | A200 STAFF OFFICES

Staff Offices is the office space for staff who require work space outside of the residential pods. The offices will be grouped together and share these location/adjacency needs: easy access to the public entry (in particular the rest rooms, which they will share with facility visitors), staff support spaces and the residential pods.

Hours of Operation

A200 7 AM-6 PM, Monday-Friday

Security

The staff office area will be separated from the public entry by a control point.

A206 Therapist will be accessed by residents when accompanied by staff.

Functions/Adjacencies

All offices should have a high level of sound separation from adjoining spaces.

A201 Secretary/Reception is the initial point of contact for public entering the facility. This space must be directly adjacent to the Lobby/Waiting, separated from it by a transaction window. The Secretary/Receptionist must be able to see people as they approach and enter the building. This workstation will also be the location for shared office amenities such as a copier/printer, office supplies, small work counter, etc. For this function, it must be easily accessible by all staff members.

A202-A204 and A207-A208 are private offices for administrative and professional staff. They should be grouped together, with easy access to the Secretary/Reception area, staff support spaces and residential pods.

A205 Charting Room will house the nurse charting function for all of the residential pods, with capacity for two staff members. This room is also where medical exams that are part of the admissions process will take place.

A206 Therapist is a private office but will also serve as a venue for private counseling with residents. It has a stronger need than other offices for easy accessibility from the residential pods.

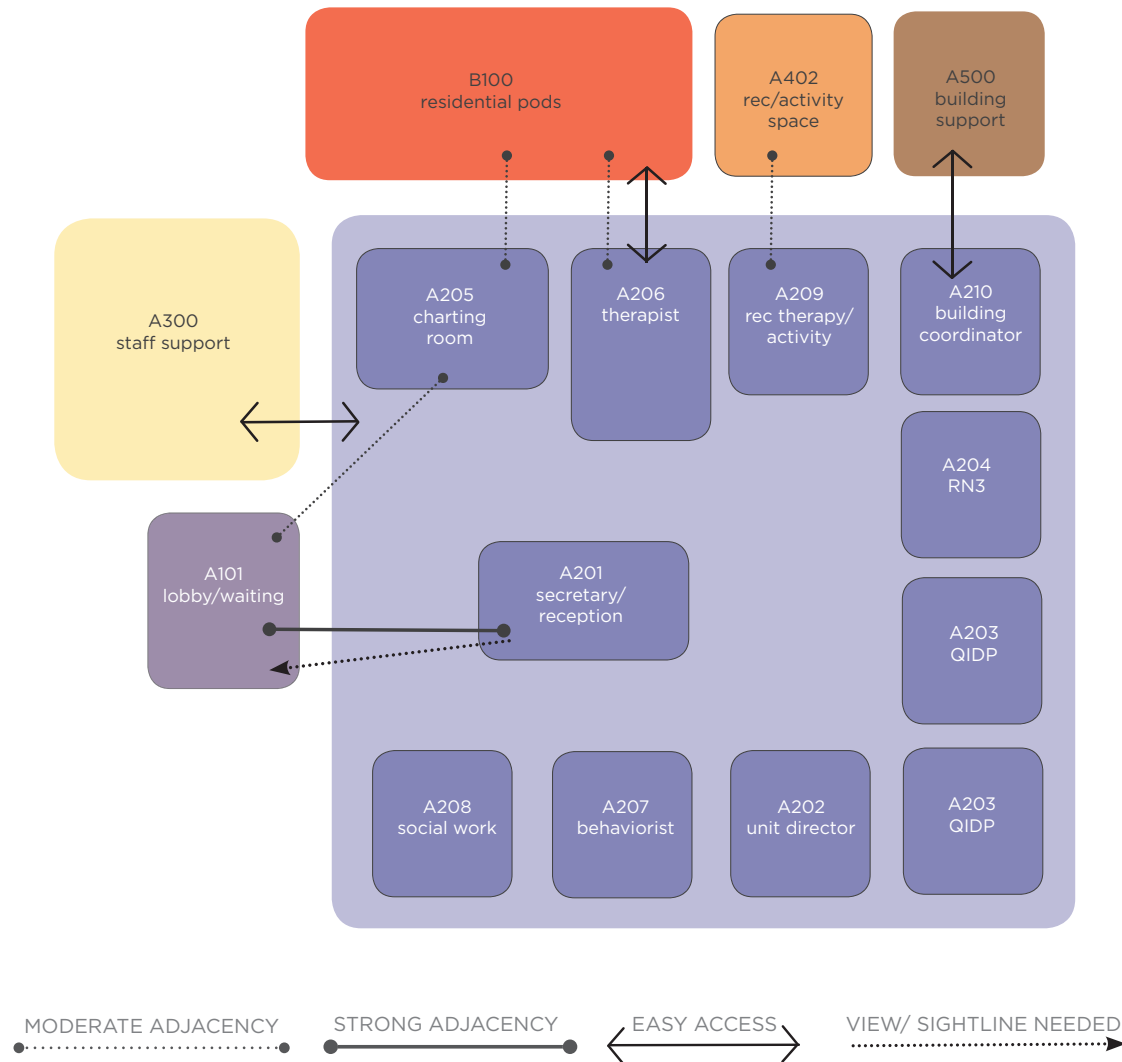
A209 Rec Therapy/Activity is a shared office for two staff members who manage and organize activities and recreational therapy for facility residents.

A210 Building Coordinator is a private office for the staff member who will manage the physical facility.

A. CENTRAL CORE						
		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
A200	STAFF OFFICES			1,380	1,835	2,184
A201	Secretary/Reception	1	120	120	160	190
A202	Unit Director	1	120	120	160	190
A203	QIDP	2	120	240	319	380
A204	RN3	1	120	120	160	190
A205	Charting Room	1	150	150	200	237
A206	Therapist	1	150	150	200	237
A207	Behaviorist	1	120	120	160	190
A208	Social Work	1	120	120	160	190
A209	Rec Therapy/Activity	1	120	120	160	190
A210	Building Coordinator	1	120	120	160	190



A200 STAFF OFFICES



A201 SECRETARY/RECEPTION

AREA: 120 NSF

Space Quantity: 1

Occupants: Secretary plus 1-2 other people in office equipment area

Function: Open workstation for Secretary/Receptionist, who provides office support for facility staff
Reception & access control to the facility
Shared office equipment & supplies

Adjacency: Directly adjacent to Lobby/Waiting; separated by transaction window
Visibility from workstation to entry vestibule
Adjacent to staff offices

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Sliding transaction window to Lobby/ Waiting

Door: None

Equipment: Computer; telephone; printer/copier

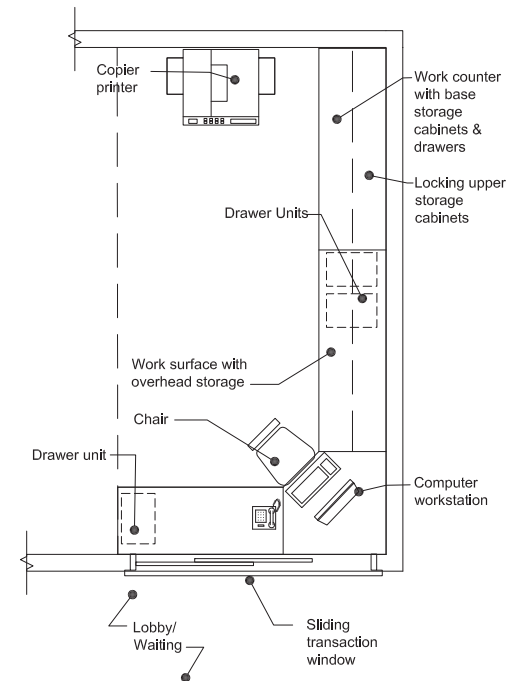
Furnishings: Systems furniture workstation with locking shelves/bins above & drawer units below
Desk chair
Systems furniture work area at shared office equipment

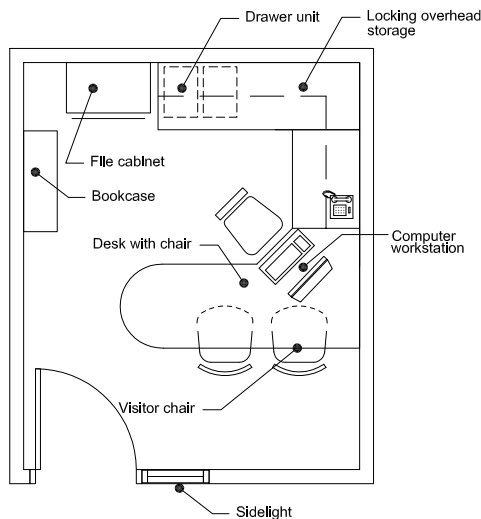
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
Electrical & data outlets for computer, telephone, printer
Dedicated circuit & outlet for copier
Office lighting, fluorescent, premium efficiency
Duress/assist alarm button

Notes: This space will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family





A202 UNIT DIRECTOR

AREA: 120 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 2 visitors

Function: Private office for Durable Housing facility Unit Director; paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Adjacent to Secretary/Reception
Easy access to Conference Room
Easily accessed from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

Furnishings: Systems furniture U-shaped desk with shelves/bins above & drawer units below
Desk chair
3 visitor chairs
Bookcase and/or locking file cabinet

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family

A203 QIDP

AREA: 120 NSF

Space Quantity: 2

Occupants: 1 occupant & up to 2 visitors

Function: Private office for QIDP (Qualified Intellectual Disability Professional); paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods
Easily accessed from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

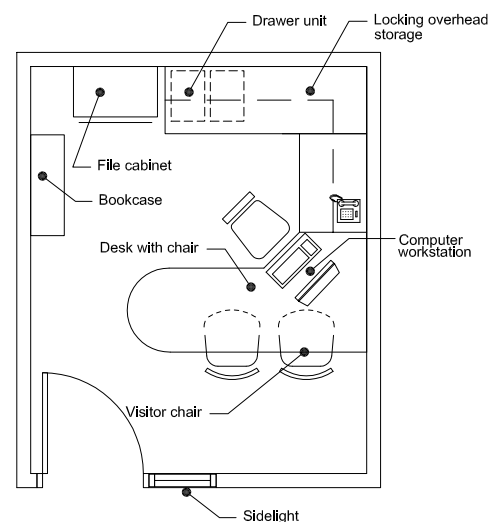
Furnishings: Systems furniture U-shaped desk with shelves/bins above & drawer units below
Desk chair
2 visitor chairs
Bookcase and/or locking file cabinet

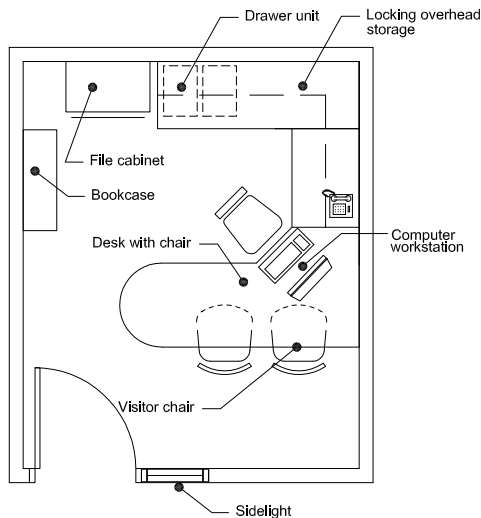
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family





A204 RN3

AREA: 120 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 2 visitors

Function: Private office for RN3; paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods
Easily accessed from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Door: Entry door sidelight

3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

Furnishings: Systems furniture U-shaped desk with shelves/
bins above & drawer units below
Desk chair
2 visitor chairs
Bookcase and/or locking file cabinet

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family

A205 CHARTING ROOM

AREA: 150 NSF

Space Quantity: 1

Occupants: Up to 2 people

Function: Enclosed, private room
Nurse charting/paper work related to resident care & residential pod management
Physical exams for incoming residents

Adjacency: With administrative offices
Easy access from Lobby/Waiting (exam function)
Easy access to residential pods

Environment:

Floor: Stained concrete, VCT or ceramic tile

Walls: Hardened gypsum board, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior window desired

Door: 3' x 7' steel door, locking

Equipment: 2 computers, 2 telephones, 1 shared printer, 1 shredder
Millwork cabinet with locking storage cabinets/drawers for medical exam supplies & equipment

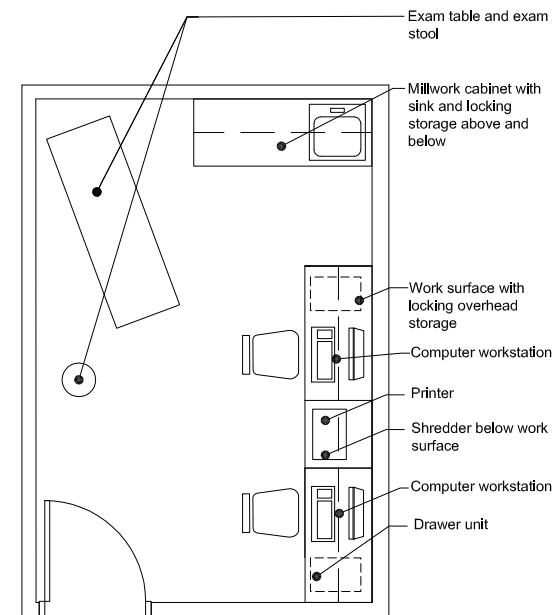
Furnishings: Systems furniture worksurfaces with locking bins/shelves above & drawer units below
Bookcase for charts (notebooks)
2 desk chairs, 1 visitor chair
Medical exam table & exam stool

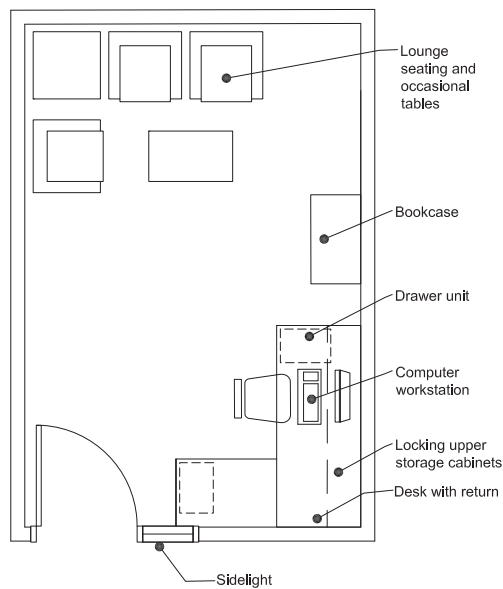
Mechanical: HVAC to design conditions

Plumbing: Stainless steel lavatory with gooseneck faucet & thermostatic mixing valve, in millwork cabinet

Electrical: Duplex electrical outlets
Electrical & data outlets for computers, telephones, printer & shredder
LED lighting
Occupancy sensor, ceiling mounted

Notes: Residents will access space accompanied by staff/family





A206 THERAPIST

AREA: 150 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 3 visitors

Function: Private office for Therapist, who works with all residents
Private therapy, office paperwork, small meetings, telephone calls, computer work

Adjacency: With administrative offices
Easy access to residential pods
Easy access from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Hardened gypsum board, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' steel door, locking

Equipment: Computer; telephone

Furnishings: Systems furniture worksurfaces with locking bins/ shelves above & drawer units below
Desk chair
Occasional tables
3 lounge chairs
Bookcase and/or locking file cabinet

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
LED lighting, continuous dimming
Occupancy sensor, ceiling mounted

Notes: Residents will access space accompanied by staff/family

A207 BEHAVIORIST

AREA: 120 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 2 visitors

Function: Private office for Behaviorist; paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods
Easily accessed from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

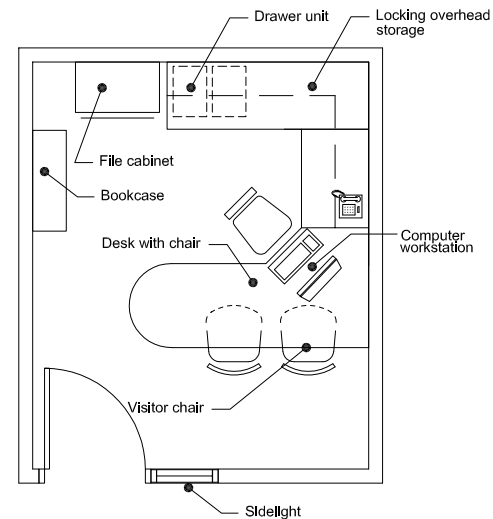
Furnishings: Systems furniture worksurfaces with locking bins/shelves above & drawer units below
Desk chair
2 visitor chairs
Bookcase and/or locking file cabinet

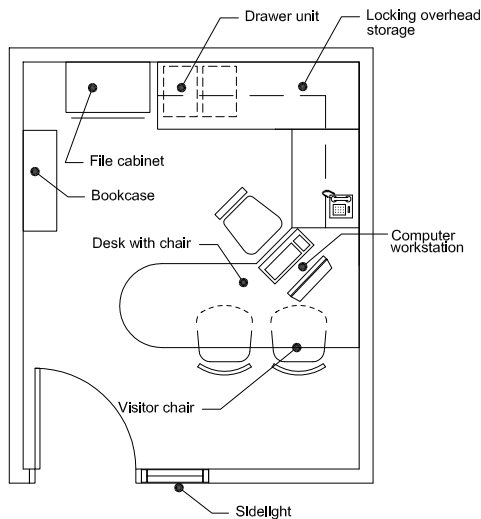
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family





A208 SOCIAL WORK

AREA: 120 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 2 visitors

Function: Private office for Social Worker; paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods
Easily accessed from Lobby/Waiting

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

Furnishings: Systems furniture worksurfaces with locking bins/
shelves above & drawer units below
Desk chair
2 visitor chairs
Bookcase and/or locking file cabinet

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family

A209 REC THERAPY/ACTIVITY

AREA: 120 NSF

Space Quantity: 1

Occupants: 2 occupants & 1 visitor

Function: Shared office for 2 Rec Therapy staff members; paperwork; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: 2 computers; 2 telephones

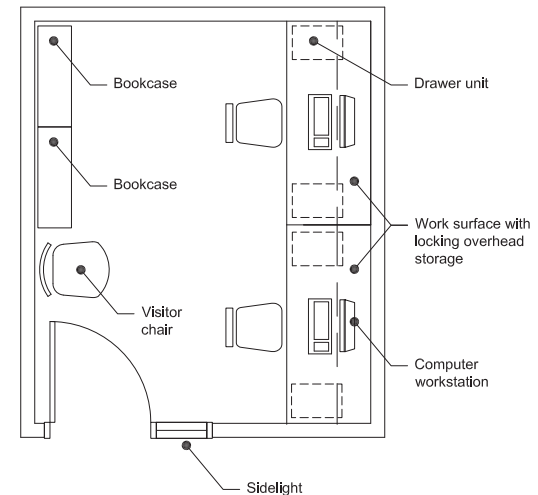
Furnishings: Systems furniture worksurfaces with locking bins/shelves above & drawer units below
2 desk chairs
Visitor chair
Bookcases and/or locking file cabinets

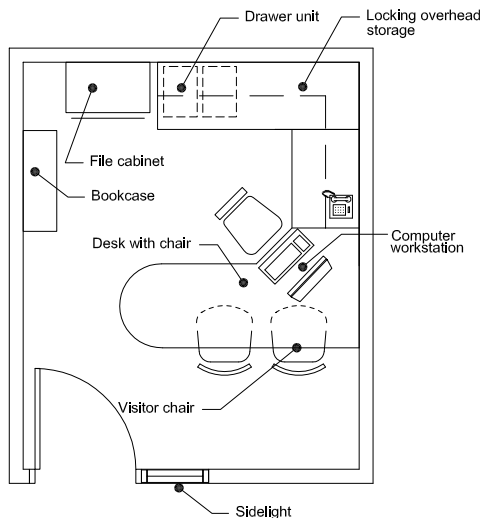
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
Electrical & data outlets for computers, telephones, & other equipment
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family





A210 BUILDING COORDINATOR

AREA: 120 NSF

Space Quantity: 1

Occupants: 1 occupant & up to 2 visitors

Function: Private office for Building Coordinator; paperwork; small meetings; computer work; telephone calls

Adjacency: With administrative offices
Easy access to residential pods
Easy access to building service & maintenance areas

Environment:

Floor: Carpet

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows

Entry door sidelight

Door: 3' x 7' wood or steel door (to be determined during design), locking

Equipment: Computer; telephone

Furnishings: Systems furniture worksurfaces with locking bins/shelves above & drawer units below
Desk chair
2 visitor chairs
Bookcase and/or locking file cabinet

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
2 sets of data outlets for furniture layout flexibility
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents when accompanied by staff/family

A. CENTRAL CORE | **A300 STAFF SUPPORT**

These are non-office spaces that will be used by facility staff on a frequent basis.

Hours of Operation

A300: 24-hour, 7 days per week

Security

The staff support spaces will be separated from the public entry by a control point.

A301 Conference Room will be accessed by visitors and residents when accompanied by staff.

Functions/Adjacencies

A301 Conference Room will be used for the admissions function as well as for the full range of meetings that take place in the Admissions and Safe Housing facility. Although in a controlled-access area, it must be easy for visitors to reach. It should have a high level of sound separation from adjoining spaces.

A302 Staff Lounge and A303 Staff Shower should be adjacent to each other and in a location out of view of visitors or the public. It would be beneficial for these spaces to be near the A102 Rest Rooms that will be used by staff.

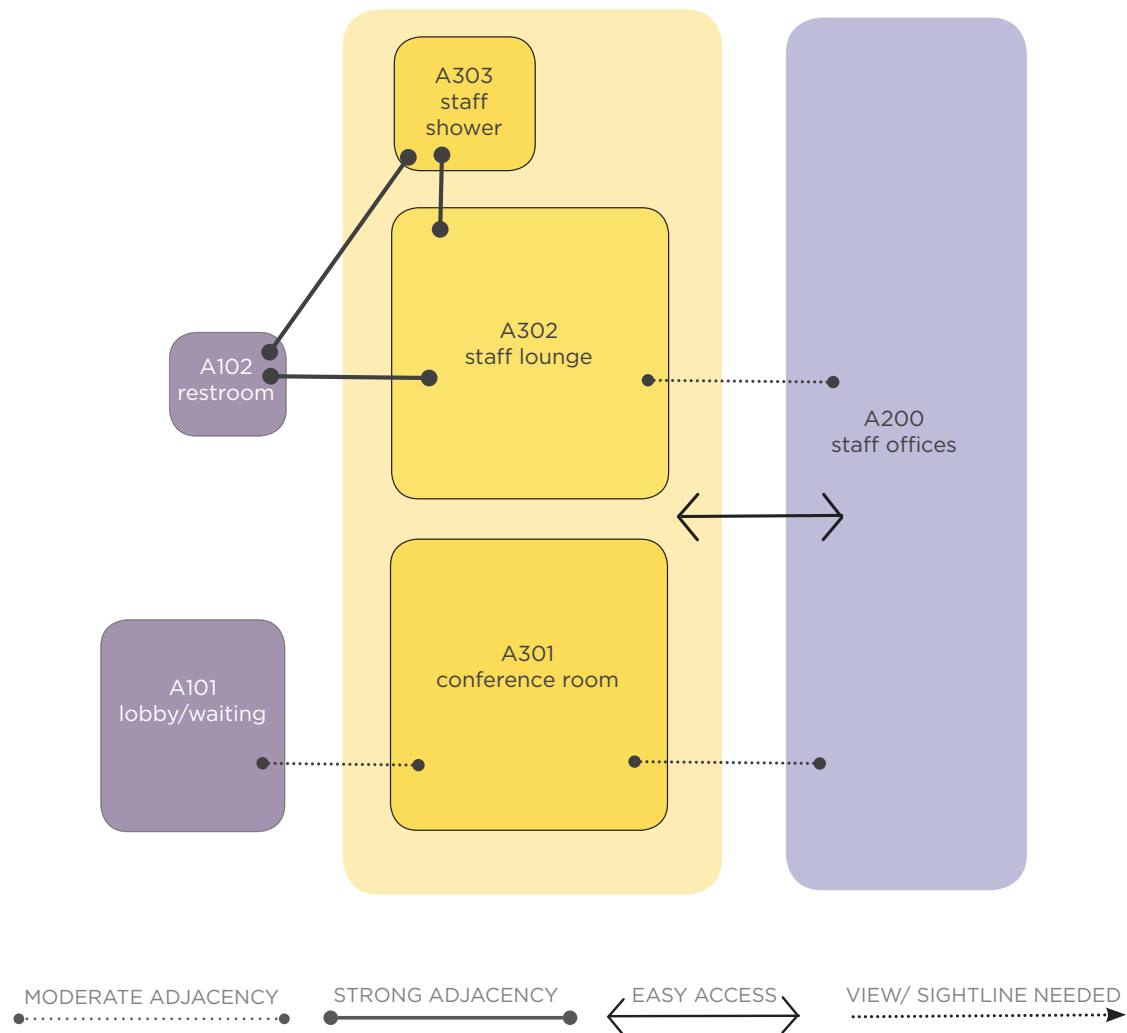
The staff time clock should be in a convenient but non-public and low-visibility location in the staff support area.

A. CENTRAL CORE

		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
A300	STAFF SUPPORT			540	722	860
A301	Conference Room	1	240	240	319	380
A302	Staff Lounge	1	240	240	319	380
A303	Staff Shower	1	60	60	84	100



A300 STAFF SUPPORT



A301 CONFERENCE ROOM

AREA: 240 NSF

Space Quantity: 1

Occupants: Up to 16 people

Function: Meetings (intake, staff, coordination, etc.)

Adjacency: Easily accessible by visitors & staff

Environment:

Floor: Carpet

Walls: Decorative CMU, honed

Ceiling: Lay-in acoustic tile/gypsum board; 9'-6" height

Windows: Exterior windows desired

Entry door sidelight

Door: 3' x 7' steel door, locking

Equipment: Wall-mounted flat-panel monitor, recessed in wall, rear access, polycarbonate cover
Monitor control station at table
Videoconferencing equipment

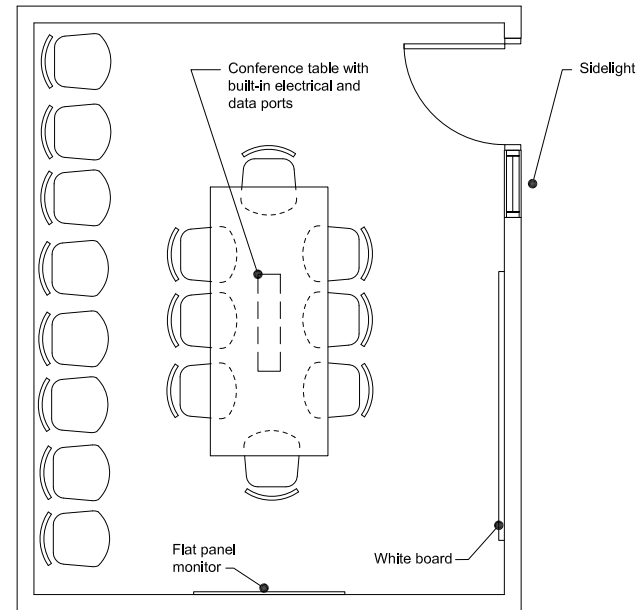
Furnishings: Table, 8' long x 42" wide, integral electrical & data
8 chairs at table
8 chairs at room perimeter
White board, wall-mount, 8' long x 4' high

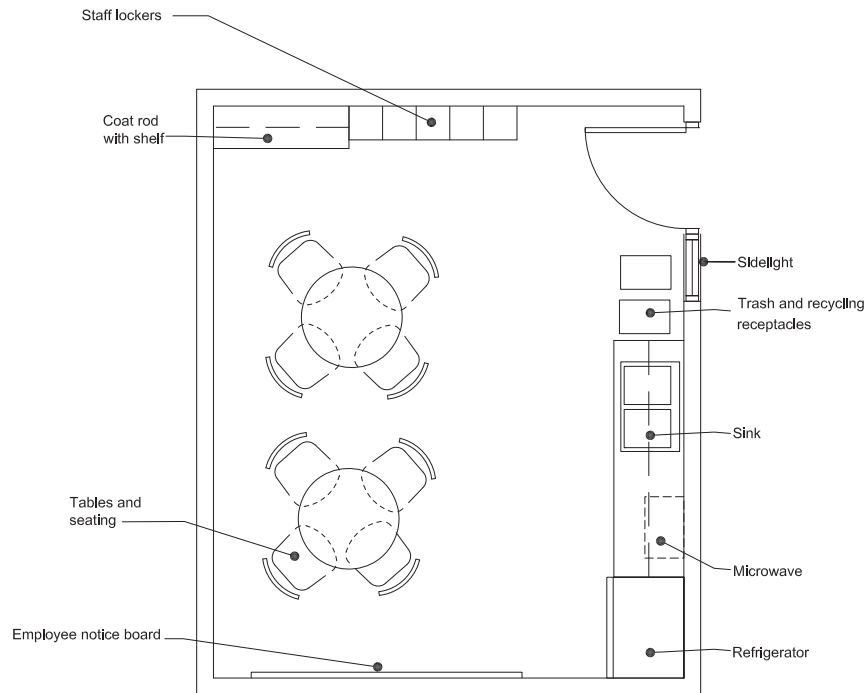
Mechanical: Dedicated HVAC zone, HVAC to design conditions

Plumbing: None

Electrical: Electrical outlets
Electrical, data & audio/visual outlets in floor;
coordinate with table pedestal locations
Electrical & audio/visual infrastructure for
videoconferencing capability
LED lighting, continuous dimming
Multiple preset lighting zones to support AV use

Notes: Residents will access space accompanied by staff/family





A302 STAFF LOUNGE

AREA: 240 NSF

Space Quantity: 1

Occupants: Up to 8 people

Function: Staff break & lunch space

Adjacency: Near staff rest rooms & Staff Shower
Near staff offices & entry

Environment:

Floor: Stained concrete or ceramic tile

Walls: Painted gypsum board

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Exterior windows
Entry door sidelight

Door: 3' x 7' wood door, locking

Equipment: Millwork countertop with locking storage cabinets/drawers below, storage cabinets above
Refrigerator with ice maker, microwave oven above counter, coffee machine
4' wide coat rod for staff coats
(30) 12" x 12" x 12" powder-coated steel shared-use staff lockers, designed for user-provided padlocks

Furnishings: (2) 42" diameter tables with 4 chairs each
Employee notice board
Trash & recycling receptacles

Mechanical: Dedicated HVAC zone with exhaust, HVAC to design conditions

Plumbing: Water hook-up for refrigerator ice-maker; double-compartment stainless steel sink; kitchen faucet

Electrical: Duplex electrical outlets
Electrical outlets above countertop, GFI near sink
Dedicated circuit electrical outlets as required for refrigerators, microwaves, coffee machine
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: Non-resident area

A303 STAFF SHOWER

AREA: 60 NSF

Space Quantity: 1

Occupants: 1 occupant

Function: Single-user shower facility for staff use

Adjacency: Near staff rest rooms & Staff Lounge

Environment:

Floor: Stained concrete or ceramic tile

Walls: Ceramic tile/painted gypsum board

Ceiling: Painted gypsum board; 9' height

Windows: None

Equipment: Prefabricated fiberglass shower compartment with rod
Solid-surface vanity with integral sink; wall-mounted mirror above
5 robe hooks; grab bars; soap & paper towel dispensers at vanity
Millwork changing bench, 3' wide x 16" deep

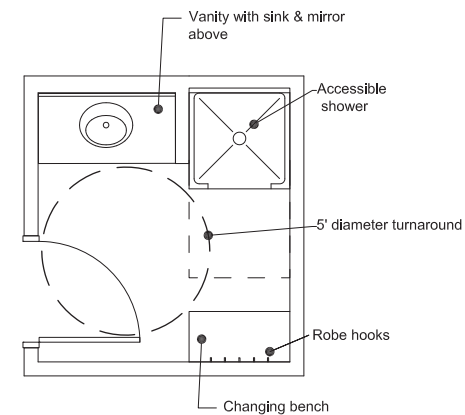
Furnishings: Shower curtain

Mechanical: Dedicated HVAC zone with exhaust

Plumbing: ADA compliant shower valve with fixed head, hand held head & pressure balance shower valve; floor drain at shower

Electrical: Duplex electrical outlets, GFI
Electrical outlets at vanity, GFI
Fluorescent lighting, premium efficiency
Shower downlight, LED, water resistant

Notes: Non-resident area



A. CENTRAL CORE | A400 ACTIVITY SPACE

These are spaces that support activities that will occur in the facility.

Hours of Operation

A401: 8 AM-5 PM, Monday-Friday
A402: 8 AM-5 PM, 7 days per week

Security

The Activity Spaces will be separated from the public entry by a control point.

A401 Classroom will be accessed by residents when accompanied by staff.

Functions/Adjacencies

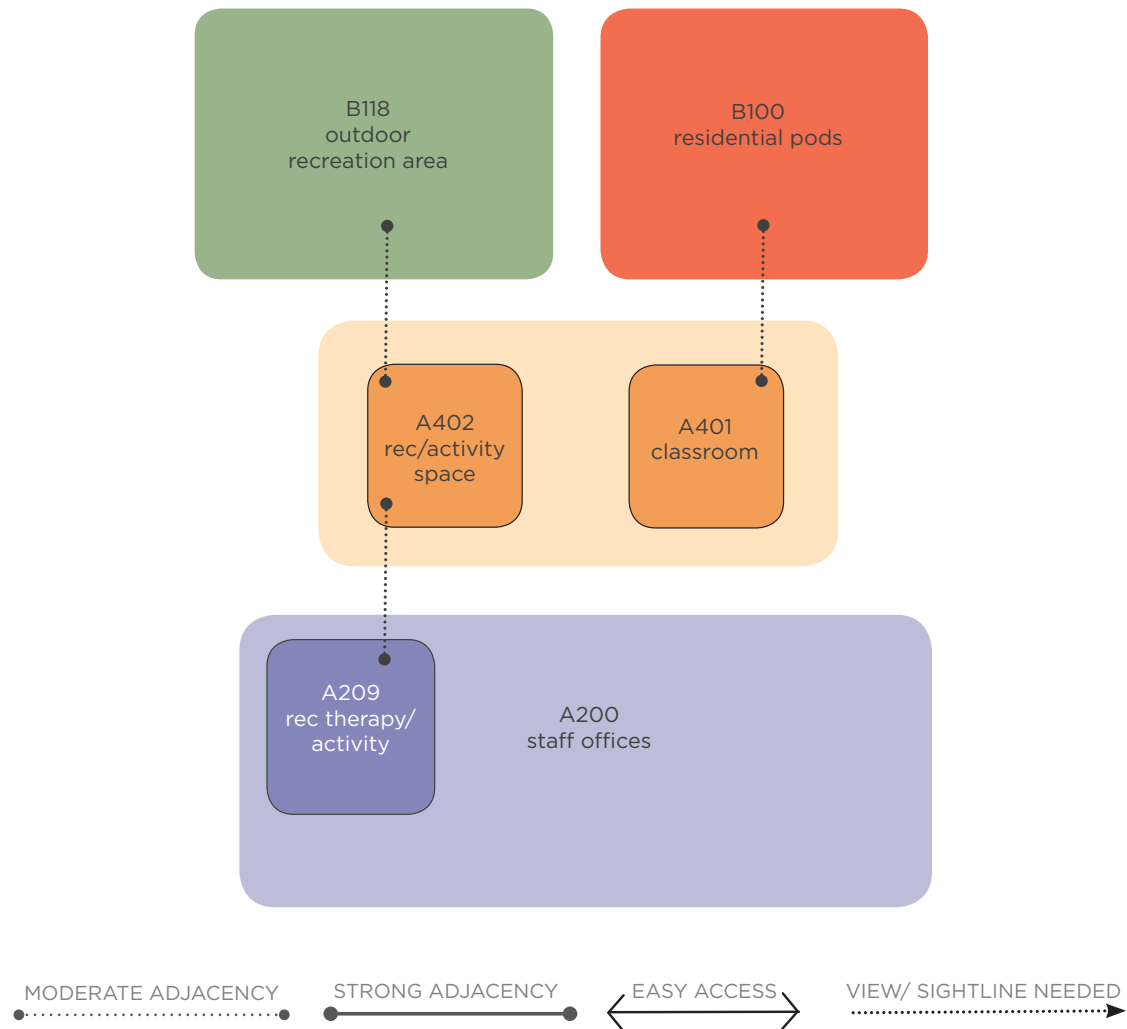
A401 Classroom will be used for individual educational sessions with residents, of two to three hours' duration. (The USDC is required to provide educational services to residents younger than 23.) This space must be easily accessible from the residential pods.

A402 Rec/Activity Storage is a room for the storage of equipment and materials that will be used in the Outdoor Recreation Areas and elsewhere in the facility. This space should be adjacent to the facility service entrance and must have good accessibility to the residential pods.

A. CENTRAL CORE						
		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
A400	ACTIVITY SPACE			220	293	348
A401	Classroom	1	120	120	160	190
A402	Rec/Activity Storage	1	100	100	133	158



A400 ACTIVITY SPACE



A401 CLASSROOM

AREA: 120 NSF

Space Quantity: 1

Occupants: Up to 4 people (2 residents & 2 teachers/staff)

Function: One-on-one educational sessions& activities for residents who are 18 or younger
Typical room usage will be by 1 resident & 1 teacher/staff; occasionally 2 residents & staff members will use the room at the same time

Adjacency: Easily accessible by facility staff & residents

Environment:

Floor: Carpet
Walls: CMU, painted
Ceiling: Painted gypsum board; 9'-6" height
Windows: Exterior windows desired
Entry door sidelight
Door: 3' x 7' steel door, locking

Equipment: None

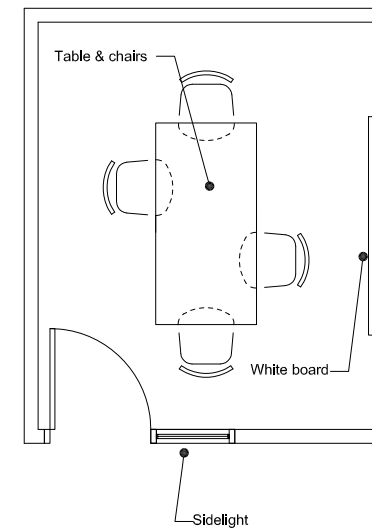
Furnishings: Table, 6' long x 3' wide
4 chairs
White board, wall-mount, 6' long x 4' high

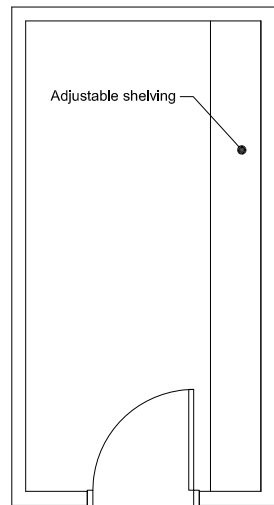
Mechanical: Dedicated HVAC zone

Plumbing: None

Electrical: Electrical outlets
Data outlet
Wireless data access
LED lighting

Notes: Residents will access space accompanied by staff





A402 REC/ACTIVITY STORAGE

AREA: 100 NSF

Space Quantity: 1

Occupants: None

Function: Enclosed room for storage of recreational therapy materials & equipment

Adjacency: Easily accessible from Outdoor Recreation Areas

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: None (open structure)

Windows: None

Door: 3' x 7' steel door, locking

Equipment: Heavy-duty steel shelving units, 7' high x 18-24" deep, in a portion of room, with adjustable shelving

Furnishings: None

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: Non-resident area

A. CENTRAL CORE | A500 BUILDING SUPPORT

Building Support is a block of back-of-house spaces that serve the operational needs of the entire facility, but primarily the residential pods. It must be directly adjacent to the building’s service entrance.

Hours of Operation

A500: 24-hour, 7 days per week

Security

Building Support spaces will be in a portion of the building that is not accessible by the public and residents.

Functions/Adjacencies

A501 Soiled Linen Pickup and A502 Clean Linen are holding spaces for outgoing soiled and incoming clean linens used in the residential pods. There will be frequent traffic between the pods and the holding areas, so they should be connected by a fairly direct pathway. Although they will be near each other, it is a requirement that there be no cross-contamination between the soiled and clean linen areas. They must be adjacent to the service entrance.

A504 Service Staging is an interior space directly inside the building service entrance. A503 Storage, General should be adjacent to this, with easy access to all areas of the facility.

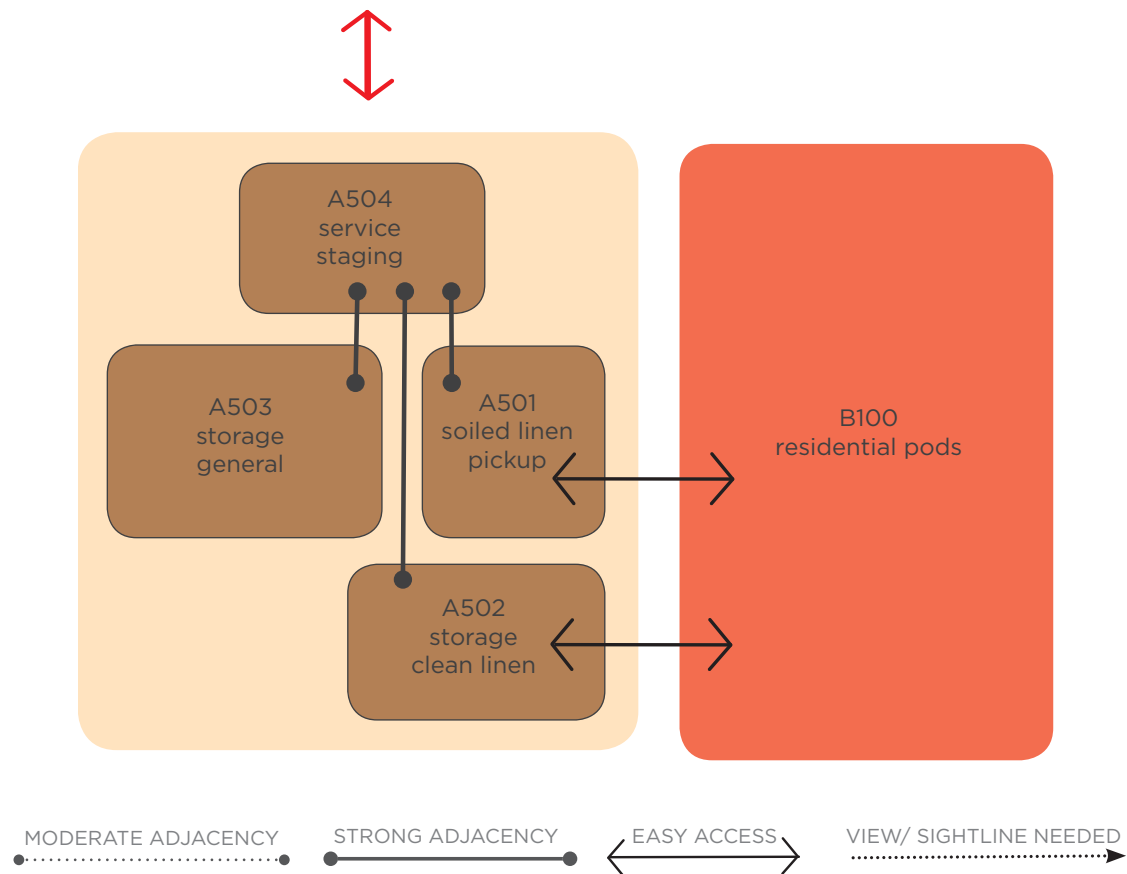
A. CENTRAL CORE

		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
A500	BUILDING SUPPORT			470	625	744
A501	Soiled Linen Pickup	1	100	100	133	158
A502	Storage, Clean Linen	1	100	100	133	158
A503	Storage, General	1	150	150	200	237
A504	Service Staging	1	120	120	160	190



A500 BUILDING SUPPORT

SERVICE ENTRY



A501 SOILED LINEN PICKUP

AREA: 100 NSF

Space Quantity: 1

Occupants: 1 staff member (occasional)

Function: Room for holding of soiled linen for pick-up
Collection & holding area for trash & recycling

Adjacency: Near facility service entrance
Easy access to residential pods

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Vision panel in door

Door: 3' x 7' steel door, locking

Equipment: None

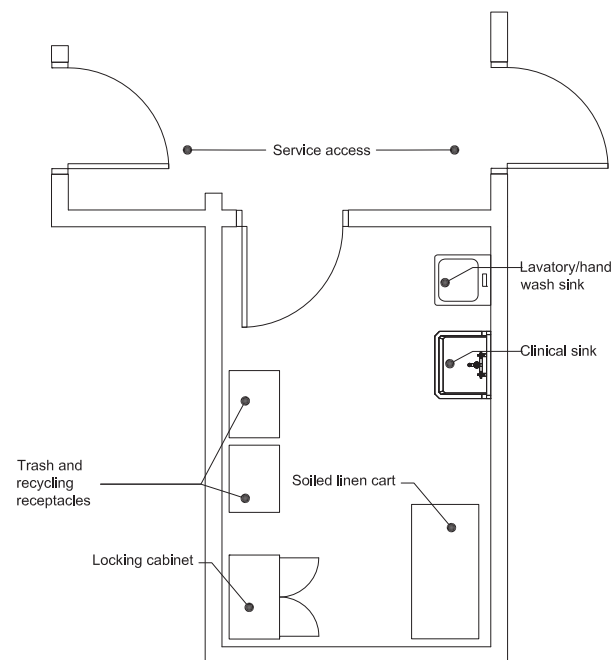
Furnishings: Locking steel storage cabinet for cleaning materials
Soiled linen cart, approx. 4' long x 2' deep x 5' high
Trash & recycling receptacles

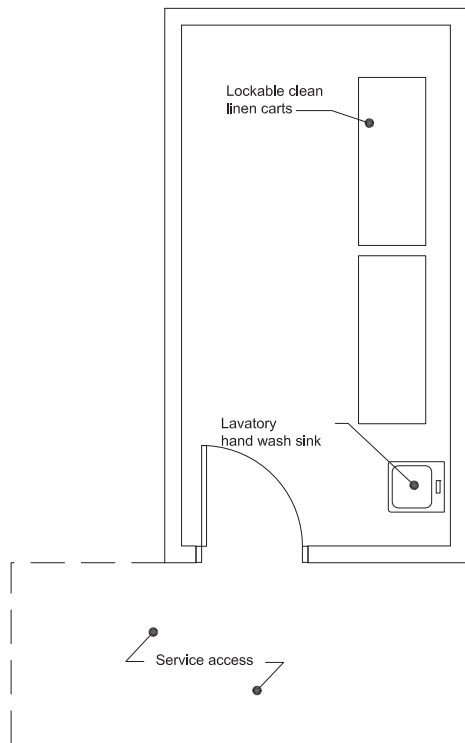
Mechanical: Exhaust

Plumbing: Vitreous china lavatory with gooseneck faucet & wrist blade handles; clinical sink with flush valve, faucet with wrist blade handles & wall-mounted bed pan washer

Electrical: Duplex electrical outlets, GFI within 6' of sink
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: Non-resident area





A502 STORAGE, CLEAN LINEN

AREA: 100 NSF

Space Quantity: 1

Occupants: 1 staff member (occasional)

Function: Enclosed room for receiving & holding clean linen

Adjacency: Near facility service entrance
Easy access to residential pods

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: Vision panel in door

Door: 3' x 7' steel door, locking

Equipment: None

Furnishings: 2 clean laundry carts, locking, approx. 5' long x 2' deep x 5' high

Mechanical: HVAC to design conditions

Plumbing: Vitreous china lavatory with gooseneck faucet & wrist blade handles

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: Non-resident area

A503 STORAGE, GENERAL

AREA: 150 NSF

Space Quantity: 1

Occupants: Staff (occasional)

Function: Enclosed room for storage of equipment, materials & furnishings used in facility

Adjacency: Near facility service entrance
Easy access to residential pods

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: None

Door: 3' x 7' steel door, locking

Equipment: Heavy-duty steel shelving units, 7' high x 18-24" deep, in a portion of room, with adjustable shelving

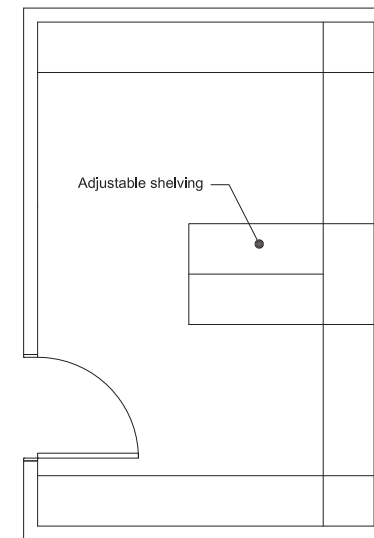
Furnishings: None

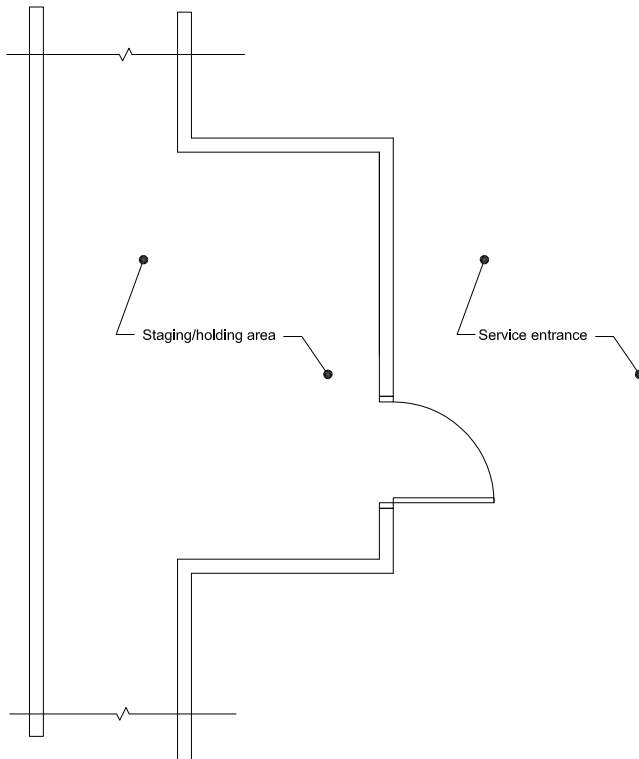
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: Non-resident area





A504 SERVICE STAGING

AREA: 120 NSF

Space Quantity: 1

Occupants: Staff (occasional)

Function: Interior space for staging of incoming or outgoing materials & equipment

Adjacency: Directly adjacent to facility service entrance
Easy access to residential pods

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: None

Door: 3' x 7' steel door, locking, insulated

Equipment: None

Furnishings: None

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted
Card reader access at service entry exterior door

Notes: Non-resident area

A. CENTRAL CORE | B100 RESIDENTIAL POD

One residential pod provides living space for twelve residents. The project will construct three residential pods, with capacity for a fourth to be added in the future.

Hours of Operation

B100: 24-hour, 7 days per week

Security

Each residential pod will have controlled entry and exit.

Functions/Adjacencies

B101 Bedroom, B102 Toilet Room and B103 Shower/Tub Room are private spaces which residents will access and use without staff accompaniment. These spaces must be arranged so that their doors are easily visible to staff who will be in the main living spaces.

B104 Living Room and B105 Electronics Area are open spaces where residents can move freely and congregate as they wish.

Access to B106 Dining Room will be controlled by staff. This space will be used on a daily basis by all residents for dining and activities requiring tables.

B107 Kitchen is a locked space; residents will access it infrequently and only when accompanied by staff. There will be a secure pass-through window between the Dining Room and Kitchen through which food will be served and dirty dishes returned to the kitchen. The kitchen must have a secondary, controlled access path connected to the service entrance, for food deliveries and trash removal.

The resident personal laundry facilities, B108 Washers and B109 Dryers, will be locked, but once staff provides access, will be used without staff accompaniment. B110 Emergency Shower/Eyewash will also have controlled staff access and is intended to be used primarily for laundry-supply-related accidents.

B111-112, Program Lead and Staff Rest Room are locked spaces accessed only by staff. They should be located near the entry to the pod, away from the main residential space.

B113 Pod Storage, B114 Resident Storage and B117 Custodial Closet will be locked spaces accessed only by staff and should be located away from the main residential space.

The alcove portion of B115 Medications should be easy to access from the main residential space, but should be visually private. The medications dispensing room will be locked, with staff-only card reader access.

B116 Time-Out Room must be easily accessible from the main living spaces in the pod, but should be located to isolate it acoustically from other residential areas as much as possible.

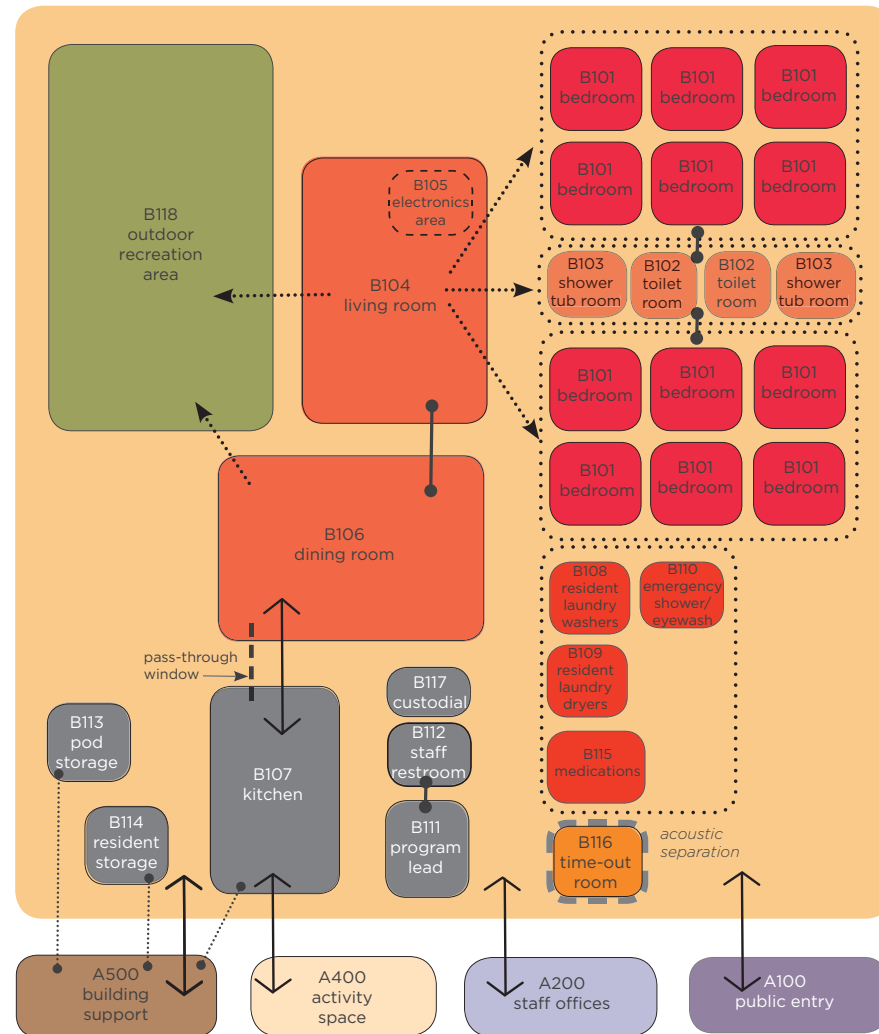
B118 Outdoor Recreation Area will have card reader access from B104 Living Room. It should be visible from both living and dining room exterior windows. It must be entirely enclosed by the building and/or security fencing to prevent residents from leaving.

B. RESIDENTIAL PODS

		Space Qty.	NSF/ Space	Total NSF	DGSF	GSF
B100	1 POD (12 BEDS)			3,696	4,878	5,805
B101	Bedroom	12	102	1,224	1,628	1,937
B102	Toilet Room	2	45	90	126	150
B103	Shower/Tub Room	2	80	160	224	267
B104	Living Room	1	630	630	788	937
B105	Electronics Area	1	100	100	133	158
B106	Dining Room	1	525	525	656	781
B107	Kitchen	1	215	215	286	340
B108	Res. Laundry-Washers	1	80	80	112	133
B109	Resident Laundry-Dryers	1	80	80	112	133
B110	Emerg. Shower/Eyewash	1	30	30	42	50
B111	Program Lead	1	80	80	112	133
B112	Staff Rest Room	1	42	42	59	70
B113	Pod Storage	1	120	120	160	190
B114	Resident Storage	1	80	80	112	133
B115	Medications	1	100	100	133	158
B116	Time-Out Room	1	80	80	112	133
B117	Custodial Closet	1	60	60	84	100
B118	Outdoor Recreation Area	1	1,200			



B100 RESIDENTIAL POD



B101 BEDROOM

AREA: 110 NSF

Space Quantity: 12 (per pod)

Occupants: 1 resident

Function: Sleeping, dressing, storage of clothes & personal belongings, reading

Adjacency: Accessed from residential pod main hallway
Bedroom doors visible from pod main living space

Environment:

Floor: Stained concrete

Walls: CMU, painted; easily washable

Ceiling: Painted hardened gypsum board; easily washable;
9'-6" height

Windows: Exterior window with integral blinds

Door: 3' x 7' steel door (out-swinging), locks to prevent entry from outside, always allows exiting from inside

Equipment: High-durability prefabricated or millwork clothes storage closet (3' wide x 2' deep) with some open storage cubbies & fixed shelf that can be used to hang clothes; bolted to walls/floor

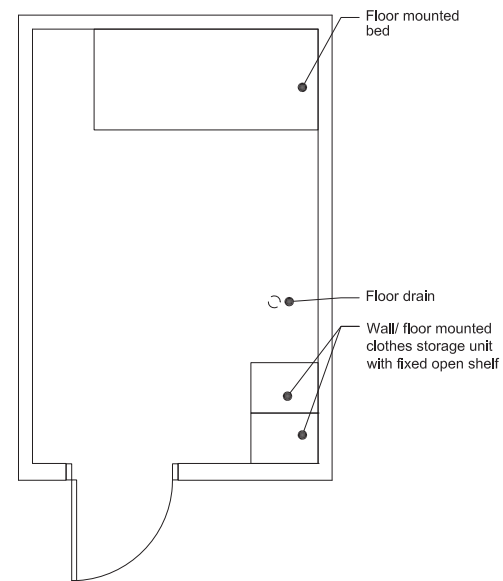
Furnishings: Single bed, bolted to floor; 36" wide x 75" long

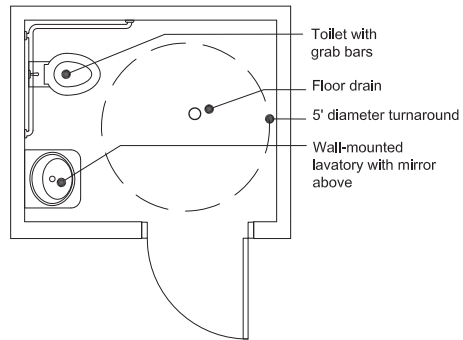
Mechanical: Dedicated HVAC zone; vandal proof fixtures

Plumbing: Floor drain

Electrical: Safety arc flash electrical outlets with staff-control key switch
Resident area lighting with staff-control key switch, LED, medium security grade
Night light, LED, medium security grade

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements





B102 TOILET ROOM

AREA: 45 NSF

Space Quantity: 2 (per pod)

Occupants: 1 resident plus possible staff

Function: Toilet facilities for residents

Adjacency: Adjacent to Shower/Tub Rooms
Accessed from residential pod main hallway
All Toilet Room doors visible from pod main living space

Environment:

Floor: Stained concrete or ceramic tile
Walls: Ceramic tile; easily washable
Ceiling: Hardened gypsum board; easily washable
Windows: None
Door: 3' x 7' steel door (out-swinging), locking

Equipment: Mirror above wall-mount lavatory
Grab bars; soap, paper towel & toilet tissue dispensers

Furnishings: None

Mechanical: Dedicated HVAC zone with exhaust; vandal proof fixtures

Plumbing: Vitreous china floor mounted back outlet water closet with concealed flush valve; wall mounted solid surface lavatory with anti-ligature faucet & thermostatic mixing valve; concealed hose bibb; floor drain

Electrical: None
Resident area lighting, LED, medium security grade

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements

B103 SHOWER/TUB ROOM

AREA: 80 NSF

Space Quantity: 2 (per pod)

Occupants: 1 resident plus possible staff

Function: Shower & bathtub facilities for residents

Adjacency: Adjacent to Toilet Rooms
Accessed from residential pod main hallway
Shower/Tub Room doors visible from pod main living space

Environment:

Floor: Stained concrete or ceramic tile

Walls: Ceramic tile; easily washable

Ceiling: Ceramic tile; easily washable

Windows: None

Door: 3' x 7' steel door (out-swinging), locking

Equipment: Mirror above wall-mount lavatory; 3 robe hooks; soap & paper towel dispensers

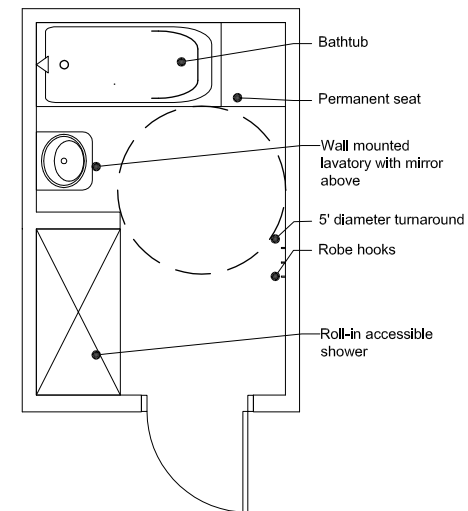
Furnishings: None

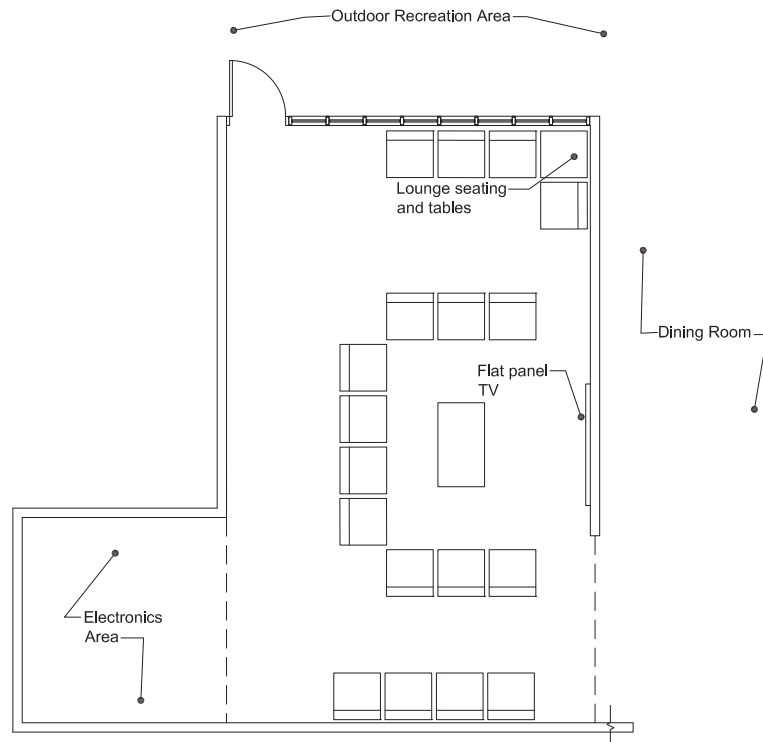
Mechanical: HVAC to design conditions with exhaust; vandal proof fixtures

Plumbing: Enameled cast iron bathtub with electronic, anti-ligature bath valve & permanent transfer seat
Electronic anti-ligature shower valve with two fixed shower heads
Wall hung lavatory with anti-ligature faucet & concealed thermostatic mixing valve
Floor drain at shower

Electrical: None
Resident area lighting, LED, medium security grade

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements





B104 LIVING ROOM

AREA: 540 NSF

Space Quantity: 1 (per pod)

Occupants: Up to 18 people (12 residents & 6 staff)

Function: Resident living room/lounge space; relaxing, interacting, reading, watching TV, etc.

Adjacency: Residential pod primary living space
Adjacent to Electronics Area, Dining Room & Kitchen

Environment:

Floor: Carpet

Walls: CMU, painted; easily washable

Ceiling: Painted hardened gypsum board; 1-1/2 to 2 story height

Windows: Exterior windows/natural light; view to Outdoor Recreation Area

Door: 3' x 7' steel door, locking, to Outdoor Recreation Area; with vision panel

Equipment: Security camera
Wall-mounted flat-panel TV, recessed in wall, rear access, polycarbonate cover

Furnishings: Security lounge seating (16 people)
Security occasional tables

Mechanical: Dedicated HVAC zone; vandal proof fixtures

Plumbing: None

Electrical: Safety arc flash electrical outlets per code
Resident area lighting, LED, vandal resistant
Electrical, data & cable TV outlets for TV
Wireless data access
Card reader access on Outdoor Rec Area door
Security camera

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements

B105 ELECTRONICS AREA

AREA: 100 NSF

Space Quantity: 1 (per pod)

Occupants: Up to 4 people (residents and/or staff)

Function: Semi-enclosed area for resident TV-viewing & electronic games

Adjacency: Adjacent/open to & accessed from Living Room

Environment:

Floor: Carpet

Walls: CMU, painted; easily washable

Ceiling: Painted hardened gypsum board; easily washable; 9'-6" height

Windows: None

Door: None

Equipment: Wall-mounted flat-panel TV, recessed in wall, rear access, polycarbonate cover
Locking, tamper resistant millwork cabinet for DVD player & video game consoles

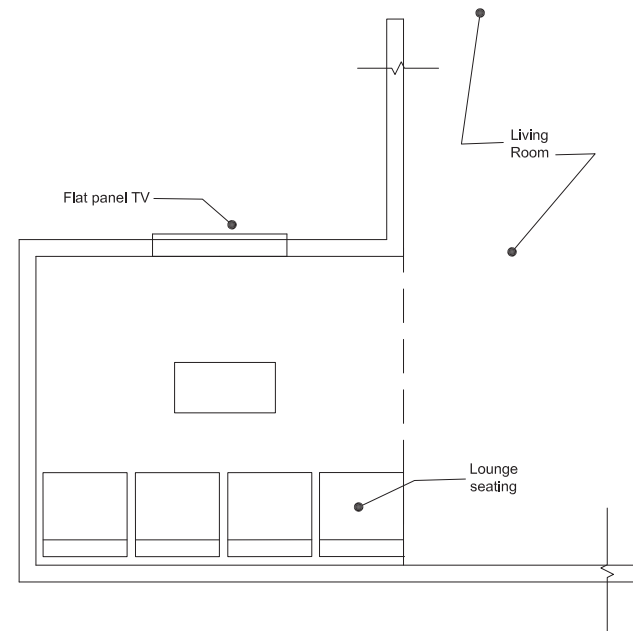
Furnishings: Security lounge seating (4 people)

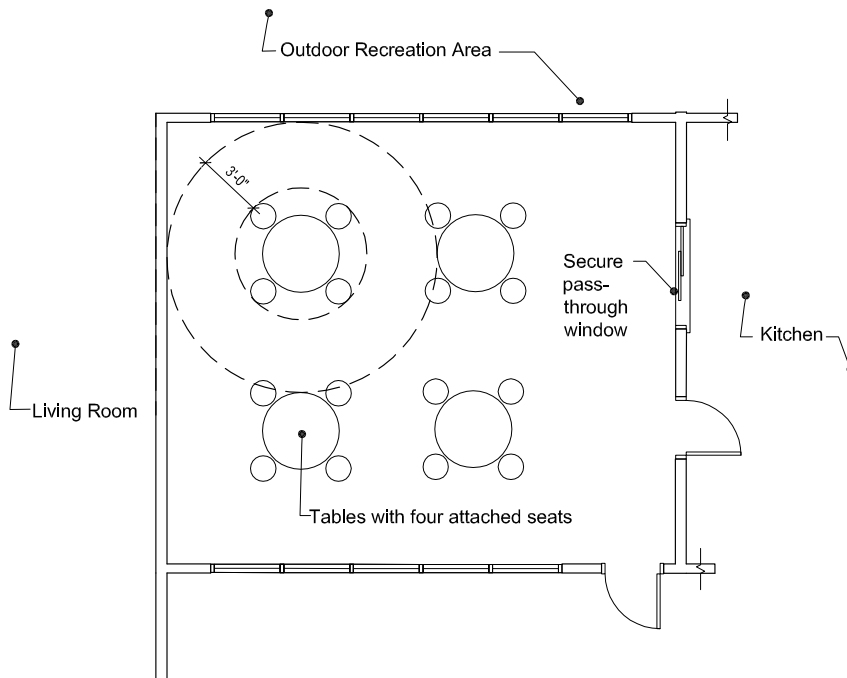
Mechanical: Dedicated HVAC; vandal proof fixtures

Plumbing: None

Electrical: Safety arc flash electrical outlets per code
Resident area lighting, LED, vandal resistant
Electrical, data & cable TV outlets for TV & gaming equipment
Wireless data access
Security camera

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements





B106 DINING ROOM

AREA: 525 NSF

Space Quantity: 1 (per pod)

Occupants: Up to 16 people (12 residents & 4 staff)

Function: Resident (& staff) dining space
Secondary use as resident activity room

Adjacency: Adjacent to Kitchen
Adjacent to & visible from Living Room

Environment:

Floor: Stained concrete or ceramic tile

Walls: CMU, painted; easily washable

Ceiling: Painted hardened gypsum board; easily washable;
1-1/2 to 2 story height

Windows: Exterior windows/natural light; view to Outdoor
Recreation Area desired
Interior windows with view to Living Room
Secure pass-through window to Kitchen

Door: 3' x 7' steel door, locking

Equipment: None

Furnishings: 4 floor-attached tables with 4 attached seats
each

Mechanical: Dedicated HVAC zone with exhaust; vandal proof
fixtures

Plumbing: None

Electrical: Safety arc flash electrical outlets per code
Resident area lighting, LED, vandal resistant
Wireless data access
Security camera

Notes: Resident-access area: equipment, fixtures &
utilities to meet resident durability, safety &
security requirements

B107 KITCHEN

AREA: 215 NSF

Space Quantity: 1 (per pod)

Occupants: Staff; occasional resident access (supervised)

Function: Food preparation for 12 pod residents plus staff
Food & food prep equipment storage

Adjacency: Adjacent to Dining Room
Accessible from facility service entrance without passing through residential pod

Environment:

Floor: Stained concrete or ceramic tile

Walls: CMU, painted; easily washable

Ceiling: Hardened gypsum board, painted; easily washable; 9'-6" height

Windows: Secure pass-through window to Dining Room

Door: (2) 3' x 7' steel doors, locking

Equipment: Solid surface countertops with locking millwork storage cabinets/drawers below & cabinets above; 7' high x 3' wide locking cabinet for activity materials used in Dining Room
Residential appliances: refrigerator with ice-maker, microwave oven, electric range/oven, dishwasher

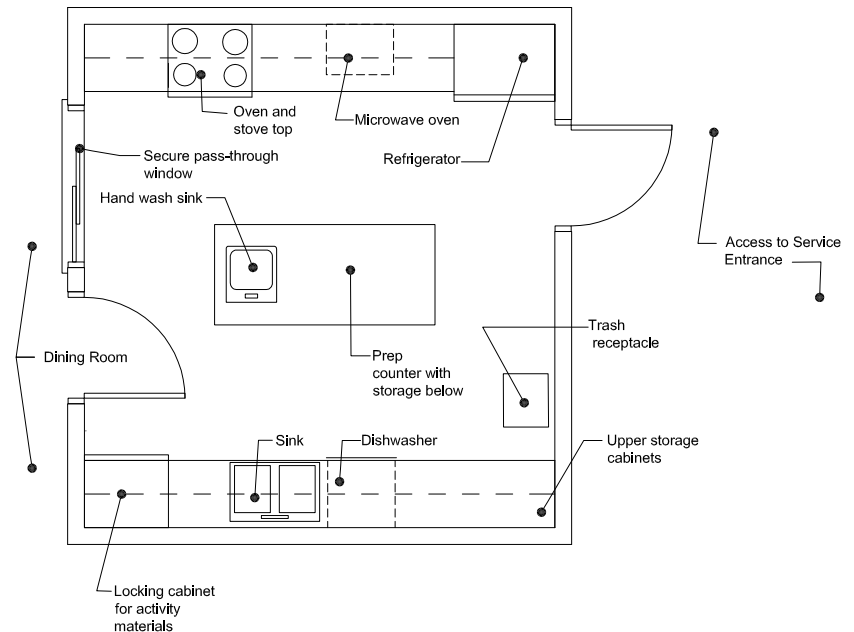
Furnishings: None

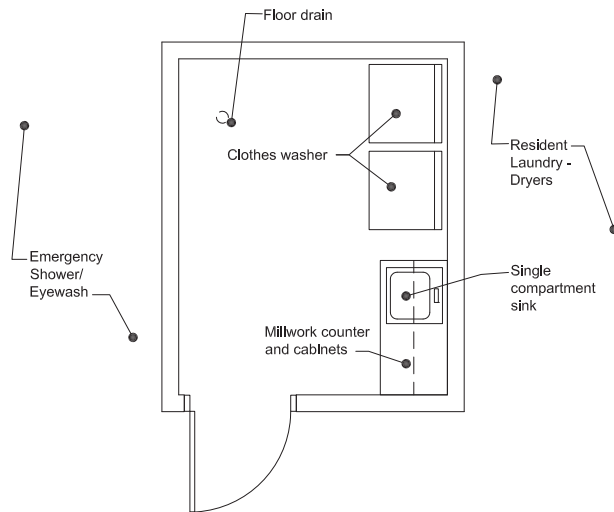
Mechanical: Dedicated HVAC zone with exhaust

Plumbing: Stainless steel hand-wash lavatory w/gooseneck faucet & thermostatic mixing valve; stainless steel 2-compartment sink w/kitchen faucet; water valve w/water hammer arrestor for refrigerator

Electrical: GFI duplex electrical outlets per code
GFI electrical outlets above countertop
Shunt trip breakers & GFI electrical outlets as required for appliances
Resident area lighting, LED

Notes: Residents will access space accompanied by staff





B108 RESIDENT LAUNDRY-WASHERS

AREA: 80 NSF

Space Quantity: 1 (per pod)

Occupants: 1 resident, possibly 1 staff

Function: Enclosed room for resident to sort & wash his/her personal laundry

Adjacency: Within residential pod, easily visible to staff
Directly adjacent to Emergency Shower/Eyewash
Directly adjacent to Resident Laundry-Dryers

Environment:

Floor: Stained concrete or ceramic tile

Walls: CMU, painted; easily washable

Ceiling: Hardened gypsum board, painted; easily washable; 9'-6" height

Windows: Vision panel in door

Door: 3' x 7' steel door, locking (out-swinging)

Equipment:

Solid surface countertop with locking millwork storage cabinets above & below
2 large-capacity, heavy-duty residential clothes washing machines

Furnishings:

None

Mechanical:

Dedicated HVAC zone; exhaust; vandal proof fixtures

Plumbing:

ADA stainless steel counter mounted sink, 5.5" deep with faucet; floor drain; washer boxes with water hammer arrestors; concealed hose bibb

Electrical:

Safety arc flash duplex electrical outlets per code
Safety arc flash electrical outlets above counter, GFI

Dedicated circuit electrical outlets for washers
Resident area lighting, LED, medium security

Notes:

Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements

B109 RESIDENT LAUNDRY-DRYERS

AREA: 80 NSF

Space Quantity: 1 (per pod)

Occupants: 1 resident, possibly 1 staff

Function: Enclosed room for resident to dry & fold his or her personal laundry

Adjacency: Within residential pod, easily visible to staff
Directly adjacent to Resident Laundry-Washers

Environment:

Floor: Stained concrete or ceramic tile

Walls: CMU, painted; easily washable

Ceiling: Hardened gypsum board, painted; easily washable; 9'-6" height

Windows: Vision panel in door

Door: 3' x 7' steel door (out-swinging), locking

Equipment: Solid surface countertop with locking millwork storage cabinets above & below
2 large-capacity, heavy-duty, electric residential clothes drying machines

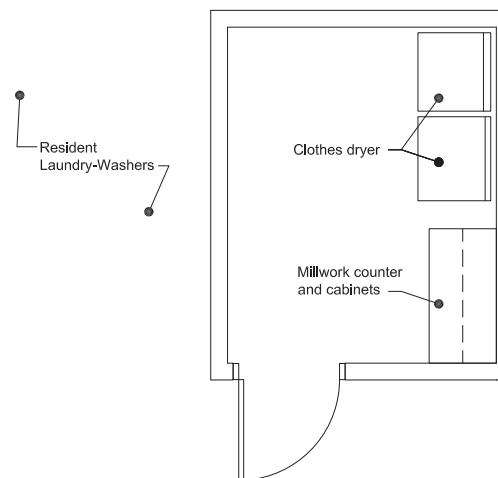
Furnishings: None

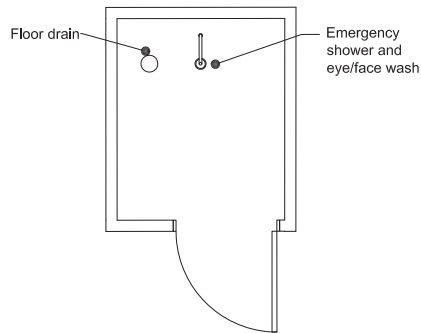
Mechanical: Dedicated HVAC zone; exhaust; dryer vent; vandal proof fixtures

Plumbing: None

Electrical: Safety arc flash duplex electrical outlets per code
Safety arc flash electrical outlet above counter
Dedicated circuit electrical outlets for dryers
Resident area lighting, LED, medium security

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements





B110 EMERGENCY SHOWER/EYEWASH

AREA: 30 NSF

Space Quantity:	1 (per pod)
Occupants:	1-2 people
Function:	Enclosed room for emergency shower & eyewash equipment; for use primarily for emergencies/accidents involving clothes washing products & chemicals
Adjacency:	Directly adjacent to Resident Laundry-Washers
Environment:	
Floor:	Sealed concrete
Walls:	CMU, painted; easily washable
Ceiling:	Hardened gypsum board, painted; easily washable; 9' height
Windows:	Vision panel in door
Door:	3' x 7' steel door (out-swinging), locking
Equipment:	None
Furnishings:	None
Mechanical:	Shared HVAC zone; exhaust fan (manual switch); vandal proof fixtures
Plumbing:	Floor drain Free standing emergency shower eyewash with thermostatic mixing valve
Electrical:	Duplex electrical outlet, GFI as code-required Fluorescent lighting, premium efficiency
Notes:	Residents will access space accompanied by staff

B111 PROGRAM LEAD

AREA: 80 NSF

Space Quantity: 1 (per pod)

Occupants: 1 occupant & up to 2 visitors

Function: Private office for Program Lead; paperwork; computer work; telephone calls
Location for wall-mounted security monitors

Adjacency: Located near entry point to residential pod
Directly adjacent to Staff Rest Room

Environment:

Floor: Carpet
Walls: Painted gypsum board
Ceiling: Lay-in acoustic tile; 9'-6" height
Windows: Entry door vision panel
Door: 3' x 7' steel door, locking

Equipment: Computer; telephone; wall-mounted security monitors (4)

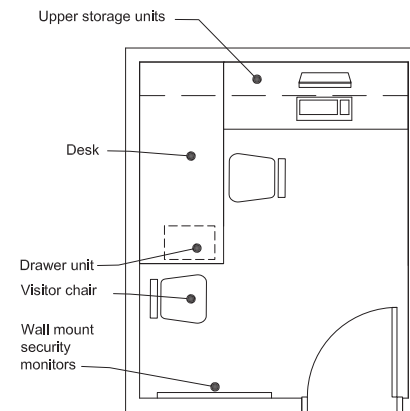
Furnishings: Systems furniture L-shaped desk with locking storage bins above & drawer units below
Desk chair
Visitor chair

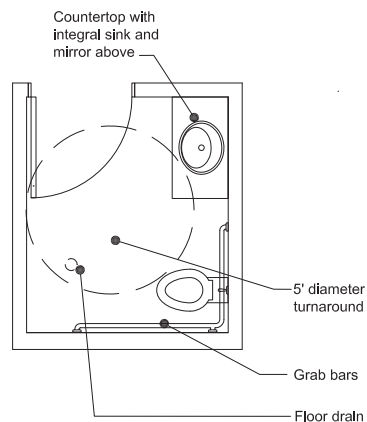
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlets
Electrical & data outlets for computer, telephone & security monitors
Office lighting, fluorescent, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area will be accessed by residents





B112 STAFF REST ROOM

AREA: 42 NSF

Space Quantity: 1 (per pod)

Occupants: 1 staff member

Function: Single-user, unisex toilet room for use by residential pod staff

Adjacency: Directly adjacent to Program Lead office
Within residential pod

Environment:

Floor: Stained concrete or ceramic tile

Walls: Ceramic tile/painted gypsum board

Ceiling: Painted gypsum board; 9' height

Windows: None

Door: 3' x 7' steel door, locking

Equipment: Solid-surface countertop with integral sink, with wall-mounted mirror above
Grab bars; soap, paper towel & toilet tissue dispensers

Furnishings: None

Mechanical: Exhaust HVAC to design conditions

Plumbing: Wall hung vitreous china water closet with manual shut-off valve; 0.5 GPM lavatory faucet; floor drain; concealed hose bibb

Electrical: Duplex electrical outlet, GFI
Electrical outlets at countertop, GFI
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area will be accessed by residents

B113 POD STORAGE

AREA: 120 NSF

Space Quantity: 1 (per pod)

Occupants: 1-2 staff (occasional)

Function: Enclosed room for materials, supplies & equipment used in residential pod

Adjacency: Within residential pod; near service entrance

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: None

Door: 3' x 7' steel door, locking

Equipment: None

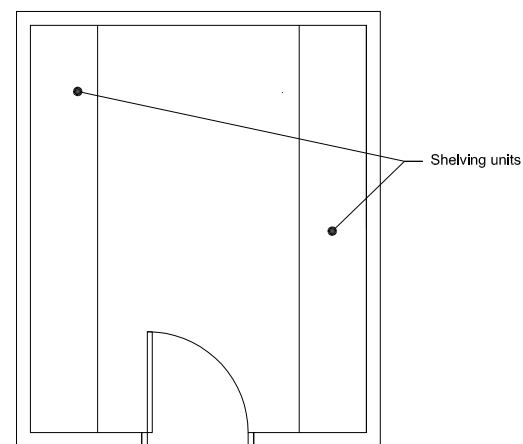
Furnishings: 7' high adjustable steel shelving units, 18-24" deep, along 2 walls

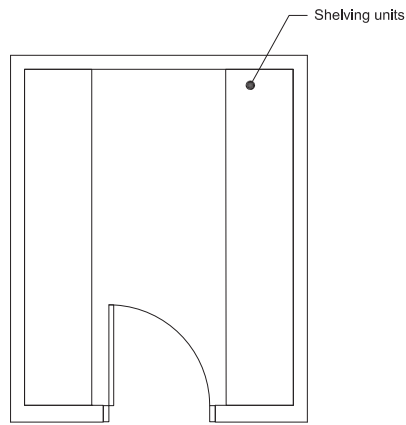
Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents





B114 RESIDENT STORAGE

AREA: 80 NSF

Space Quantity: 1 (per pod)

Occupants: 1-2 staff (occasional)

Function: Enclosed room for storage of residents' personal belongs that cannot be kept in their bedrooms; materials to be stored in large plastic tote bins on adjustable steel shelving

Adjacency: Within residential pod; near service entrance

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: Lay-in acoustic tile; 9'-6" height

Windows: None

Door: 3' x 7' steel door, locking

Equipment: None

Furnishings: Adjustable steel shelving units, 6' high x 24" deep, along 2 walls

Mechanical: HVAC to design conditions

Plumbing: None

Electrical: Duplex electrical outlet
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents

B115 MEDICATIONS

AREA: 100 NSF

Space Quantity: 1 (per pod)

Occupants: 1 staff & 1 resident

Function: 2 spaces: 1) enclosed, secure room for staff to store, prepare & dispense medication; 2) resident alcove for receiving & self-administering medication
Separated by secure pass-through window

Adjacency: Within residential pod

Environment:

Floor: Stained concrete or ceramic tile

Walls: CMU, painted

Ceiling: Painted gypsum board; 9'-6" height

Windows: Medication pass-through window

Door: 3' x 7' steel door (out-swinging), locking

Equipment: Millwork countertop with locking storage cabinets/drawers above & below; locking cabinet for controlled substances; under-counter refrigerator; computer workstation, telephone

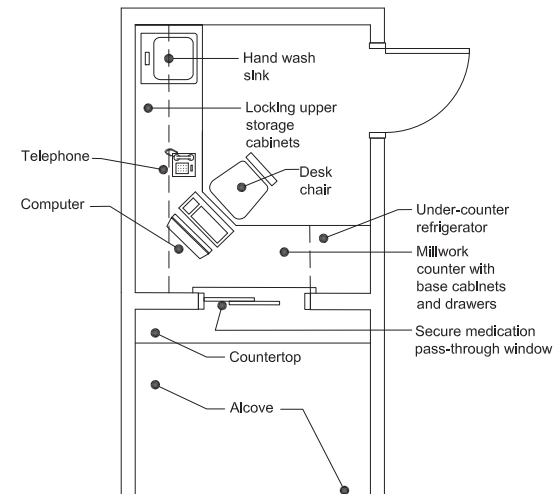
Furnishings: Desk chair for 36" high counter

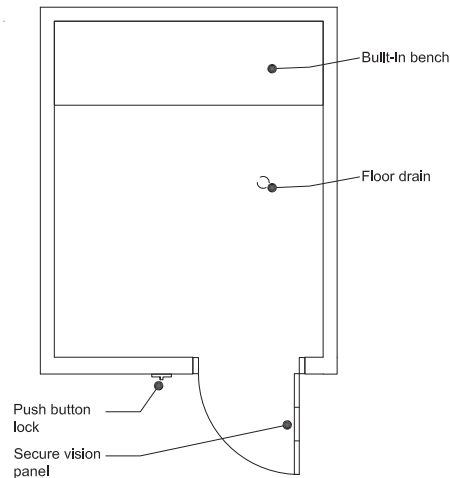
Mechanical: HVAC to design conditions; vandal proof fixtures

Plumbing: Stainless steel counter-mounted sink with gooseneck faucet & wrist blade handles

Electrical: Safety duplex electrical outlets per code, including outlets above countertop (GFI within 6' of sink)
Electrical & data outlets for computer, telephone
Dedicated circuit outlet for refrigerator
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted
Card reader access on secure room door

Notes: Visual privacy required for alcove
Alcove is a resident-access area; secure room will not be accessed by residents but the general area will be accessed by residents





B116 TIME-OUT ROOM

AREA: 80 NSF

Space Quantity: 1 (per pod)

Occupants: 1 resident (occasional)

Function: Enclosed room for residents when agitated/out of control; acoustic isolation as possible

Adjacency: Within residential pod, away from primary living spaces, for maximum acoustic separation
Pathway to Time-Out Room from within pod must be: as short/direct as possible; free of objects, finishes, etc. susceptible to damage or destruction by out-of-control resident

Environment:

Floor: Concrete with synthetic-resinous padding

Walls: CMU or concrete with synthetic-resinous padding

Ceiling: Hardened gypsum board with synthetic-resinous padding; 9'-6" height

Windows: One-way, secure vision panel in door

Door: 3' x 7' steel door (out-swinging), faced with synthetic-resinous padding; lock activated by constant applied pressure applied to adjacent push-button

Equipment: Built-in 18" deep concrete bench along 1 wall; faced with synthetic-resinous padding
Intercom system for staff/resident communication
Security camera

Furnishings: None

Mechanical: HVAC to design conditions; vandal proof fixtures

Plumbing: Floor drain; concealed hose bibb

Electrical: No electrical outlets; Resident area lighting, LED, medium security grade

Notes: Resident-access area: equipment, fixtures & utilities to meet resident durability, safety & security requirements
All room interior surfaces (except vision panel) coated with synthetic resinous padding

B117 CUSTODIAL CLOSET

AREA: 60 NSF

Space Quantity: 1 (per pod)

Occupants: None

Function: Storage of custodial & maintenance supplies & equipment

Adjacency: Near residential pod service entry

Environment:

Floor: Sealed concrete

Walls: CMU, painted

Ceiling: None (open structure)

Windows: None

Doors: 3' x 7' steel door, locking

Equipment: Mop & broom rack, 3' long
Heavy-duty, adjustable open shelving on wall standards
Housekeeping cart

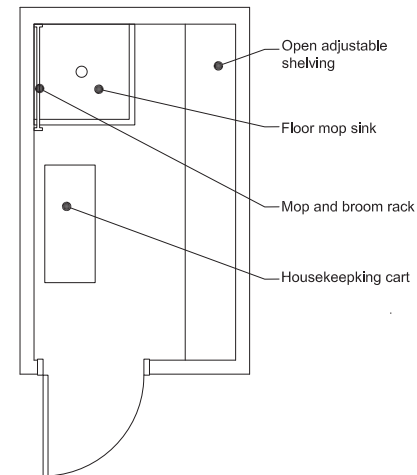
Furnishings: None

Mechanical: HVAC to design conditions

Plumbing: Enameled cast iron floor-mounted service sink with faucet & hose, cold water supply with shut-off valve for connection to chemical feed system

Electrical: Duplex electrical outlets, GFI
Fluorescent lighting, premium efficiency
Occupancy sensor, ceiling mounted

Notes: This room will not be accessed by residents but this general building area may be accessed by residents



5 | BUILDING SYSTEMS

STRUCTURAL CRITERIA

The structural design for this project should provide a building system which will integrate with the program requirements for space layout, as well as with the architectural and building service needs, while meeting current code standards for vertical and horizontal load carrying capacity. User needs in terms of current flexibility of the spaces and future adaptability of use should be considered. The level of user comfort as determined by the acoustic and vibration sensitivity of the structure also should be addressed. The facility will consist of an administrative/office area connected to a series of housing pods. The initial phase of construction anticipates three (3) 12 resident housing pods with accommodation for a future fourth housing pod. It is important to confirm that the total number of residents does not equal or exceed 50 as this will require the Risk category to be increased from II to III. The program anticipates all portions of the project to be single story without any basement areas, and does not expect any significant roof top equipment will be included.

Structural / Service Coordination

Layout of the structural grid will need to respect the office, public area, and residential spaces established for the various building functions. During the design phase, a completely integrated approach to building systems is recommended. Distribution of HVAC, plumbing and electrical services must be carefully coordinated with the structural elements, particularly at framing intersections and major crossover points. This close coordination must be achieved in order to avoid conflicts and limit penetrations of major structural members. The current or future inclusion of any sustainable elements such as roof top PV arrays needs to be incorporated into the design of the roof structure.

Codes & Standards

Codes and standards that apply to the design of this building are:

- 2012 International Building Code
- ASCE 7, Minimum Design Loads for Buildings and Other Structures
- DFCM Design Criteria for Architects and Engineers, May 25, 2005
- American Institute of Steel Construction (AISC) Steel Construction Manual with Commentary
- ACI 318 Building Code Requirements for Reinforced Concrete
- ACI 530 Building Code Requirements for Masonry Structures

- American Iron and Steel Institute (AISI) Specifications for the design of Cold-Formed Steel Structural Members
- American Welding Society (ANSI/AWS) D1.1 Structural Welding Code
- Steel Joist Institute (SJI) for open web Joists and Girders
- Steel Deck Institute (SDI) for Metal floor and roof Decks

Geotechnical Criteria

A site specific geotechnical investigation has been completed at this time. GSH geotechnical engineers has generated a final geotechnical report which is included in the appendix. The site is primarily sand and granular soils that should be adequate to support the proposed building loads. Allowable bearing pressures of 2500 psf are expected on compacted structural fill. The borings indicate the site to have significant amounts of uncontrolled fills that must be removed and replaced with structural fill. The borings indicate depths of 5.5' to 7.5' of this uncontrolled fill material exists over the site. No collapsible, expansive, or liquefiable soils are known to exist in this area.

Design Criteria

The structural systems in the facility shall be designed to meet the requirements of the 2012 International Building Code (IBC) and the Design Criteria Manual adopted by the Utah State Building Board. The following minimum requirements should be anticipated:

- **Risk Category**..... Category II (Building is designated as occupancy category I2. The current program anticipates 36 residents with future growth to 48 residents. Group I2 occupancies with 50 or more residents would fall in Risk Category III. If the final design includes capacity (current or future) for 50 or more residents the Risk Category must be increased to III and the associated importance factors must be adjusted accordingly.)



- **Wind Loads**

Wind Velocity, V_{ult} 120 mph, (3 second Gust)
 Exposure Type:.....“B” or “C” for the building structure,
 as appropriate to the final placement
 of the building on the site.
 Wind Importance Factor, I_w 1.00

- **Seismic Loads**

Short Period Mapped Acceleration, S_s 1.20 g
 Long Period Mapped Acceleration, S_1 0.43 g
 Site Class.....D
 Seismic Design CategoryD
 Seismic Importance Factor, I_e 1.00

- **Roof Loads**

Ground Snow, P_g 46.5 psf
 (Based on estimated site elevation
 of 4780'). Calculate roof snow load
 as specified in the Utah Uniform
 Building Standard Act Rules R156-
 56 issued January 1, 2002. Design
 for snowdrift where appropriate.
 Roof live loads shall not be less
 than that specified in IBC 1607.12.2.

Snow Importance Factor, I_s 1.00

- **Floor Live Loads**

Floor design live loads shall be in accordance with the latest edition of the DFCM Design Criteria Manual and the 2012 International Building Code and as follows:

1. Typical Floor - 80 psf, unreduced, except for column and footing designs
2. Movable partition load -15 psf
3. Stairs and exit ways - 100 psf

4. Lobbies and other assembly areas - 100 psf
5. Areas of concentrated standard file storage - 125 psf
6. Mechanical Equipment Rooms - 125 psf minimum or as required by actual equipment
7. Laundry facilities - 125 psf or as required by actual equipment

Areas where heavy load concentrations exceed the normal loading requirements shall be designed for the specific load case.

Note: The more stringent requirement between the 2012 IBC, the DFCM Design Criteria Manual, and the loads given above shall govern.

Floor Vibration Criteria

Control of suspended floor and roof structure vibrations due to human and mechanically induced excitation forces shall be considered in the selection of the building structural floor and roof framing systems.

It is not anticipated that any activities or equipment that are sensitive to floor vibrations will be located within this facility. This should be verified as part of the final design. Should vibration sensitive activities or equipment become necessary within the facility then structural system compatibility should be carefully evaluated.

Anticipated Construction

It is anticipated that the building will be supported on conventional reinforced concrete spread footings. Given the need to have durable surfaces in this facility, load bearing CMU construction is anticipated for the housing pods and potentially for the administrative spaces as well. Roof construction is anticipated to consist of open web joists supporting a steel roof deck. Exterior walls are likely to have a continuous layer of rigid insulation at the exterior and a finish surface such as brick veneer.

The lateral force resisting system will need to conform to the architectural configuration of the building and is likely to include reinforced CMU shear walls. Braced frames, or steel moment resisting frames should be considered where a load bearing shear wall system is not compatible with the architectural

expression. A combination of these systems may be necessary to accommodate the architectural expression of the facility.

Depending on the final design configuration, it may be advisable to make the administration and office portion of the facility structurally independent from the housing pods and separated by a seismic isolation joint. This approach would accommodate the plan irregularities that are expected based on a plan consisting of a central admin/office area connected by linking corridors to independent housing pods. This approach would also more easily accommodate the addition of future pods without the potential impacts on the existing structure that would be involved with sharing vertical or lateral support structure with the housing pods.

Structural systems incorporating wood stick framed construction are considered unacceptable with respect to the durability and life expectancy of the facility.

Future Building Expansion

The A/E designers of the building shall consider potential future horizontal expansions because:

- Future horizontal expansion of the structure is anticipated to add an additional housing pod.
- Future vertical expansion is not anticipated.

Testing and Inspections

The Architect/Engineer, and the selected testing lab, shall perform periodic construction observations, testing, and special inspections, as outlined in the DFCM Design Criteria for Architects and Engineers. The design engineer shall list all required special inspections on the contract drawings, and perform periodic construction observations as required by the A/E agreement. Costs for special inspections and testing services will be paid for directly by the owner.



MECHANICAL CRITERIA

PROPOSED UTILITY CONNECTIONS

Site Utilities

The existing site area contains utilities that serve the existing structure that is to be removed. The utilities, water, sewer, and natural gas are to be terminated at the mains. The sewer lateral is to be abandoned. The water lateral is to be capped at the main. The natural gas service line is to be capped at the main.

Storm Drain

There are currently no developed storm drainage collection and discharge facilities at the location for the proposed building. This development will increase the net storm water discharge from the site. Local requirements indicate that storm water discharge be limited to 0.20 cfs/acre of developed land. Amounts in excess of this are to be detained on site. It is recommended that the design consult with American Fork City Storm Water Technical Manual Appendix D for specific requirements.

Sanitary Sewer

The proposed facility is to be connected to the existing sanitary sewer that is directly east of building site. Exterior sanitary sewer piping should be ASTM 3034 PVC. It is anticipated that the effluent pipe from the proposed building will be 4-inch diameter and shall be sloped at 2-percent grade. This connection is to be made according to American Fork City standards for connection and is to be made above the spring line of the existing 12-inch sewer main. The finished floor of the proposed building is to account for the minimum connection invert and the slope through the building.

Culinary Water

The proposed facility is to be connected to the existing campus culinary water system. The existing underground system serves culinary and fire protection for the campus. The existing campus is arranged in three loops which are predominantly 6-inch pipes. These loops are less than the size required by State Regulation. As a minimum, the loops should be 8-inch diameter. An Engineered Water Supply Analysis is required to be performed. This analysis shall determine the capability of the existing water supply to service the proposed facility.

Care is to be taken with regard to existing on-campus water storage tanks and connection to the city water supply. The analysis is to consider conditions under each scenario for source of supply.

The proposed facility will likely interrupt an existing 4-inch water line. This line is not part of the primary loop arrangement. However, it is to remain and should be replaced with 8-inch piping, routed around the proposed facility. Culinary and fire protection services are to connect to this main through individual valve connections. Additional fire hydrants are to be added in accordance with the results of the building size and construction type. A reduction for the inclusion of fire sprinklers is to be considered in the Engineered Water Supply Analysis.

Steam and Condensate

The proposed facility is to be connected to campus steam distribution system. A concrete tunnel is to be extended from the existing tunnel to the proposed facility. Tunnel dimensions shall be same size as the existing main steam tunnel but in no case smaller than 4' wide x 7' high. The material to be used for the new facility is to match the latest design standards. The current standards provide for schedule 40 steel pipe. Condensate piping should be schedule 80 steel pipe.

Natural Gas

The need for natural gas has not been requested for the planned facility.

MECHANICAL

Codes and Standards

The HVAC system shall comply with the following codes and design standards:

DFCM Design Criteria

International Building Code, 2012 edition

International Mechanical Code, 2012 edition

International Plumbing Code, 2012 edition

International Fire Code, 2012 edition

International Energy Code, 2012 edition, ASHRAE 90.1 2010



Design Criteria	Summer	Winter
Design Temperatures, dry bulb.....	97°F	0°F
Design Temperatures, wet bulb.....	62°F	-
Site Elevation 4606 feet		

Typical Indoor Design Conditions:

Summer.....	75°F
Winter.....	72°F
Humidity	Humidification is not required for this facility

Internal Equipment Heat Gains

In addition to people and lighting loads, Heat gains in all rooms should be based on anticipated equipment to be used in each room together with appropriate diversities.

People:

Office:.....	250 BTUH, Sensible
Bedrooms:.....	200 BTUH, Latent

Lights:

Office:.....	0.70 watts/ft2
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Office Areas:.....	1 desktop with LCD Monitor per office seat 1 copy machine per office group
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Internal load calculations will be required when more specific design information becomes available in order to maintain indoor design requirements.

Ventilation/Indoor Air Quality

Comply with ASHRAE Standard 62.1-2012, Ventilation of Acceptable Indoor Air Quality, for minimum ventilation requirements. Reset the outdoor air intake flow and/or space or zone airflow as operating conditions change. Design a ventilation system that results in an air-change effectiveness greater than or equal to 0.9 as determined by ASHRAE 129-1997.

Develop and implement an Indoor Air Quality (IAQ) Construction Management Plan that includes high efficiency filters (Minimum Efficiency Reporting Value (MERV) 8, as determined by ASHRAE 52.2-1999) for systems used during construction. Provide MERV 13 filters at the air handlers when project is complete. In addition to toilet exhaust, provide exhaust for janitor closets and dedicated copy rooms at the rate of 0.5 cfm/ft2. These rooms must maintain a negative pressure between the adjoining spaces. The goal of the project is to provide the amount of ventilation air based on actual occupancy in lieu of CFM/ft2.

Commissioning

Reference DFCM Design Requirements for Commissioning. Coordinate with commissioning agent retained for the project, and comply with requirements for building commissioning detailed in DFCM Solicitation for Commissioning Services.

As part of the DFCM High Performance Building Standard, a commissioning agent will be an integral part of the design and construction of the mechanical systems. The commissioning agent is to focus on key systems identified in the contract documents as well as include systems that DFCM from past experience, deem to have been problematic. The commissioning agent validates that the key systems will comply with the Design Process, DFCM's Project Constraints, and the Basis of Design at each phase of the project.

With respect to the mechanical systems, the Design Engineer shall participate with the Commissioning Agent during design process and shall specify the mechanical and plumbing system installer is part of the commissioning. The following systems shall be included but not be limited to during the commissioning process.

- Preparation of Testing Procedures
- Verify proper operation of the demand control ventilation using CO2 sensors
- Air Handlers
- Exhaust Systems
- Fire Damper, Fire/Smoke Damper and Smoke Damper Operation
- Steam and Condensate system

- Water Source Heat Pump system
- Domestic Hot Water system
- Work directly with the Test & Balancing Contractor to ensure proper air and water flow
- Automatic Temperature Control Sequence of Operation Verification

Measurement and Verification

Install continuous metering equipment for steam consumption.

Heating

The building shall be heated with heat from the Campus Steam system. Steam shall be supplied to the primary building heat exchangers. The secondary (building side) of the heat exchangers shall require building pumps for water distribution to the building mechanical systems.

Steam shall be used for heating and domestic hot water.

BUILDING MECHANICAL / COOLING SYSTEM BASIS OF DESIGN

Heat Pump System

The building shall be air conditioned and heated through the means of a water source heat pump system. Individual heat pumps shall be provided for each central zone.

Supplemental heat to the loop system shall be provided from the steam to water heat exchangers. The building heat exchanger shall be located in a mechanical room. The steam line from the campus heating system shall be extended into the mechanical room via the utility tunnels.

Heat rejection for the heat pump loop shall be provided with cooling towers or closed circuit cooling towers located on the roof of the building.

Refer to the Sustainability section for operation parameters for the heat pump loop temperatures.

Zoning

The preferred zoning of heat pumps is to provide a dedicated heat pump for each bedroom, but at the minimum one heat pump for two bedrooms. All other areas shall be zoned as appropriate based on load and orientation. Maximum square feet per zone shall be based on DFCM Design Standards.

Heat Pump Location

All individual heat pumps shall be located in such a manner as to provide accessibility and maintenance that will not require access to individual bedrooms. Service shall be provided from the corridor or other public accessible locations at the floor level. Access to service shall not be allowed from below the ceiling. If units are located above the ceiling, access will be required from a walkway or serviceable catwalk.

Outdoor Equipment

All outdoor equipment required for the building mechanical and plumbing systems shall not be located on ground level. Any outdoor equipment such as exhaust fans, cooling towers, etc., shall be located on the roof. Access for the roof shall be from a secure access door, secure ladder, or stair to the roof.

General Exhaust

Each toilet shall be exhausted to atmosphere via roof mounted exhaust fans. Exhaust for janitor closets and dedicated copy rooms will be exhausted at the rate of 0.5 cfm/ft².

Dedicated Outside Air System

A dedicated outside air system shall be provided that delivers the minimum outside air requirements to each space and meets the requirements of IMC 2012 and ASHRAE 62.1. The DOAS shall include energy recovery on the exhaust (ERV).

Alternative System

Alternative mechanical system may be proposed given that the proposed systems are equal to or better in energy performance to the basis of design. Potential systems could include, VRF, four-pipe fan coil, or VAV reheat, however, these systems must also be provided with similar accessibility for maintenance as the basis of design system. It will be the responsibility of the design build contractor to demonstrate the energy performance and maintainability of the system.

Electrical Rooms

Each electrical room shall be provided with individual heat pumps.

CONTROLS

Provide individual room temperature controls.

The control system shall be a direct digital control (DDC) system with electric



driven actuators. The DDC system shall monitor, control and adjust the building controls from an in-building location. The following items of equipment shall be monitored and/or controlled:

- All central HVAC equipment including heat pumps, heat exchangers, pumps, variable speed drives and exhaust fans.
- All decentralized HVAC equipment such as thermostats, meters, air and water temperature sensors, system pressure sensors.
- Provide interface modules as necessary in order to provide communication and information from manufactured equipment such as heat pumps, and VFD's.

The control system shall be connected to the campus Yamas network or the campus telecommunications Ethernet network.

SUSTAINABILITY

Mechanical and plumbing systems will be designed to exceed the mandatory and prescriptive requirements of ANSI/IESNA/ASHRAE Standard 90.1-2010 (Standard 90.1) in lieu of the International Energy Conservation Code (v2012). The project building is intended to exceed the requirements of Standard 90.1 by a minimum of 15%. To meet this requirement, the project systems, equipment efficiencies, and control strategies have been adopted from the Tier 2 criteria and enhancements of the Advanced Buildings: New Construction Guide, Edition 1.0 (AB:NCG). Applicable sections from the referenced standard are listed below. Additional detail for each section has been added where needed.

Basic Requirements

- 2.9 – System Efficiency: Project equipment will meet the prescribed efficiencies listed in Table 2.9.1 of the AB:NCG for the type and capacity of equipment used. Basis-of-design water source heat pumps will have a minimum cooling efficiency of 14.0 EER and heating efficiency of 4.6 COP rated in accordance with ISO 13256-1.
- 2.10 – Economizer: Integrated air side economizers will be provided for individual systems exceeding 54,000 Btu/h in cooling capacity. Economizers, when installed, will follow the criteria of AB:NCG section 2.10.
- 2.11 – Ductwork
- 2.12 – Fan Power Reduction
- 2.13 – HVAC Controls: The existing campus DDC system will be expanded to incorporate the project building. This system will be modified as required to meet the criteria described in this section.

- 2.14 – HVAC – Fault Detection and Diagnostics: The DDC system will be capable of monitoring for failed equipment and provide alarms to the end-user via the control interface, and keep a log of faults with a 6 month history. Specific points to be monitored are listed in the AB:NCG, section 2.14.
- 2.15 – Water Heating: Building will utilize an instantaneous steam-to-hot water heat exchanger for generating hot water.
- 2.16 – Acceptance Testing: This requirement will be addressed by building systems commissioning.
- 2.17 – Whole Building Metering: Measurement devices will monitor electrical and gas use and interface with the DDC system to display data to the end-user. System will keep a minimum of 36 months of usage data.

Enhanced Requirements

- 2.22 – Energy Recovery Ventilation: Ventilation air will be tempered using energy recovery ventilation units with an effectiveness of not less than 60%. The energy recovery unit will be capable of by-passing air around the unit when energy recovery is not effective.

Basis of design requirements incorporate these prescriptive features. If alternative systems, equipment, or control strategies should be proposed by the Design Build team, the alternatives will also be required to meet or exceed these features. Sufficient documentation will be provided to the DFCM Energy Project Manager and Submittal Reviewer to show the alternate meets the Tier 2 performance.

PLUMBING

Provide a complete plumbing system as outlined below and in accordance with the Utah State Requirements and the 2012 International Plumbing Code.

Plumbing Insulation

Insulate all domestic hot, cold, hot water return and roof drainage piping with fiberglass insulation with all service jacket. Provide PVC jacket on all exposed piping insulation. Provide insulation thickness as required by the 2012 International Energy Conservation Code.

Insulate domestic hot water equipment with fiberglass insulation. Provide aluminum jacket on all exposed insulation. Provide insulation thickness as requirement by the 2012 International Energy Conservation Code.

Domestic Water System

- Below Grade Piping: Provide type K copper with wrought copper fittings and brazed joints.
- Above Grade Piping: Provide type L copper with copper fittings and soldered joints.
- Valves 2" and smaller: Provide bronze ball valves for shut off and throttling. Provide bronze swing check valves, strainers and balancing valves.
- Valves 2 1/2" and larger: Provide butterfly valves shut off and throttling. Provide cast iron swing check valves, strainers and balancing valves.
- Provide pilot operated pressure regulating valves on building cold water supply.
- Provide water hammer arrestors on cold water supply to flush valves, water boxes and washing machine boxes.
- Provide hose bibs in toilet rooms and equipment rooms.
- Provide non-freeze wall hydrants near entries to the building.
- Provide all bronze in-line centrifugal domestic hot water circulating pumps.

Waste and Vent Systems

- Below Grade Piping: Provide solid wall schedule 40 PVC piping with DWV fittings.
- Above Grade Piping: Provide no-hub cast iron pipe with DWV fittings and standard no-hub couplings.
- Floor Drains: Provide cast iron body drains with bronze tops and vandal resistant secured strainers.
- Floor Sinks: Provide cast iron floor sinks with enameled interior and bronze vandal resistant secured grates.
- Provide cleanouts as required by the 2012 International Plumbing Code.

Roof Drainage System

- Below Grade Piping: Provide solid wall schedule 40 PVC piping with DWV fittings.
- Above Grade Piping: Provide no-hub cast iron pipe with DWV fittings and standard no-hub couplings.
- Roof Drains: Provide cast iron drains with extension, underdeck clamp, sump receiver and cast iron dome. Provide 2" exterior collar on overflow roof drains. Provide bronze downspout nozzles located near grade for overflow drain discharge.
- Provide cleanouts as required by the 2012 International Plumbing Code.

Domestic Hot Water Heating

- Final Water Heating System selection to be coordinated with Owner during design.
- Provide two instantaneous, steam fired, feed forward hot water heaters each sized at 60% of the design load for redundancy.

- Alternate Hot Water Heating System: Two steam fired heat exchangers each sized at 60% of the design load with hot water storage tank and circulating pump controlled by tank aquastat.
- Provide a duplex digital thermostatic mixing valve to control the water temperature to the building at 120°F.
- Provide domestic hot water return system.

Plumbing Fixtures

Public/Staff Fixtures:

- Toilets: vitreous china wall hung toilets with manual flush valves, 1.28 gallons per flush.
- Lavatories: vitreous china wall hung with bronze, lead free manual faucet with wrist blade handles and gooseneck spout with 0.5 GPM aerator.

Resident Fixtures:

- Toilets: vitreous china, floor mounted, back outlet rear spud toilet with seat and concealed flush valve: 1.28 gallons per flush.
- Lavatories: solid surface (Terron) wall hung with anti-ligature, 0.5 GPM, bronze, lead free faucet and thermostatic mixing valve.
- Showers: concealed shower valves with "Armstrong" digital all-bronze temperature control valve. Two fixed heads. 1.5 GPM.
- Bathtubs: Enameled cast iron with seat and grab bars; "Armstrong" digital temperature control valve.

General Fixtures

- Counter mounted sinks: stainless steel with bronze, lead free gooseneck faucet. Provide 5.5" deep sinks where ADA is required.
- Service sinks: enameled cast iron with bronze service sink faucet including vacuum breaker and 5'-0" hose.
- Water coolers: dual height, vandal resistant, lead free.

FIRE PROTECTION

Automatic fire sprinklers are to be provided for the proposed facility for I occupancy. The type of system to be used is a wet type sprinkler system. Sprinkler discharge densities and areas of application shall be in accordance with NFPA 13 requirements. If the attic space is combustible construction, a dry pipe subsystem is to be utilized for that area. The use of anti-freeze solutions for piping exposed to freezing conditions is to be avoided.



The fire sprinkler riser shall be adjacent to the exterior wall. The space and access requirements are to conform to the requirements of State of Utah amendments to the International Fire Code Section 901.4.6.1-4; A minimum clear and unobstructed distance of 12 inches shall be provided from the installed equipment to the elements of permanent construction.

A clear and unobstructed width of 36 inches shall be provided in front of all installed equipment and appliances, to allow for inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly.

Automatic sprinkler system riser rooms shall be provided with a clear and unobstructed passageway to the riser room of not less than 36 inches, and openings into the room shall be clear and unobstructed, with doors swinging in the outward direction from the room and the opening providing a clear width of not less than 34 inches and a clear height of the door opening shall not be less than 80 inches.

ELECTRICAL CRITERIA

ELECTRICAL

Code Requirements

The codes and laws that apply to the electrical systems are the latest versions of the following:

National Electric Code (NEC) 2011 - NEC 2014 effective July 1, 2015
 International Energy Conservation Code (IECC) 2012/ASHRAE 90.1 2010
 International Building Code (IBC) 2012
 International Fire Code (IFC) 2012
 International Mechanical Code (IMC) 2012
 National Fire Code (NFPA) 72 2007
 American's with Disabilities Act (ADA) 1991
 ADA Application Guide (latest edition)
 Underwriters Laboratories (UL)
 State of Utah Fire Marshal's requirements R710-4
 DFCM Design Guidelines (latest edition)

Note that Section 501.1 of IECC 2012 allows the substitution of ASHRAE/IESNA Standard 90.1 for Commercial Energy Efficiency standards. It is the intent to follow ASHRAE standard 90.1 on this project, including all requirements for daylight dimming.

Standards Requirements

The additional standards that apply to the electrical systems are the latest accepted versions of the following:

NFPA
 ANSI standards as applicable
 NEMA standards as applicable
 IEEE standards as applicable
 EIA/TIA standards as applicable to Information Technology
 BICSI standards as applicable to Information Technology

Special Fire Alarm Requirements

An I-2 occupancy requires automatic smoke detection in all corridors and spaces open to the corridors. This may be accomplished with a Very Early

Smoke Detection (VESDA) system to avoid damage to individual detectors. There are also some exceptions based on IBC 2012 907.2.6.2 where visual displays UL268 devices are used, where sleeping unit doors are equipped with automatic door closers and integral smoke detection.

Provide manual fire alarm boxes as required by IBC 907.2.6. Manual fire boxes in sleeping areas are not required at exits if located at all care providers control stations and other constantly attended staff locations.

Notification is recommended as general alarm rather than private mode signaling for safety reasons to notify all residents immediately upon reported fire. There is assistance in evacuation provided by care providers, so it may be possible to provide private mode signaling in the sleeping areas only if approved by the fire code official. Where horn and strobe devices are required in the residence area they shall be ceiling mounted, rigidly supported and provided with lexan guards to protect the strobe devices.

Cooking facilities may require an ANSUL system under special hoods.

Any fan system over 2000 CFM would require a duct detector and fan shutdown upon detection, this requirement would be required regardless if other automatic or manual alarms were installed. The IMC requires smoke detection on fan systems, and fan shutdown.

Keyed fire alarm pull stations shall be used, and the fire alarm system shall be fail secure, operating even with one or more devices broken or disabled.

Power Service

Power for the Utah State Developmental Center consists of a medium voltage, 12470 volt system, owned by the state, with a single entry from the utility metered at 12470 volt. The system is of varying age and condition. In general, there are three interconnect possibilities, one being the old athletic building immediately east of the site, and the second being an above ground vault building centrally located on campus. Since the old PE building contains dangerous recalled G&W switches, it is requested that the designer use the newer above ground vault, and extend cabling and conduit from that location. The third option, which is



intercepting an existing radial feeder to a nearby building, is specifically requested to be avoided due to reliability and outage concerns.

The IECC and ASHRAE 90.1 rules require lighting loads will not exceed 1.0 watts per square foot for the office part of the building.

The designer should choose a 120/208 volt 3 phase service, due to building size and application. Note that heating plant is central, decreasing the mechanical load in this building.

Emergency Power Service

Emergency Power for the new facility will require a diesel engine generator for egress lighting, telecommunications, security, and basic cooking, food storage, living, and toilet and shower rooms. Minimal HVAC to temper the air may be added to the generator as well, but the intent is to not condition the entire building on generator power. The intent is to have the facility operational after an emergency or during an outage in short duration, so that residents may remain. Office areas do not require any additional power other than basic egress lighting and security.

Power Service Accessories

Digital metering equipment shall be provided at main service switchboard.

Transient voltage surge suppression shall be provided at the main switchboard and the emergency panelboards, and at other selected locations through the facility as determined by the design engineer.

Power Distribution

Electrical panel locations shall be centrally located to minimize branch circuit distances, this saves material and minimizes voltage drop. No point in the building shall exceed 125 feet to the nearest electrical panel, preferably most circuits shall be less than 100 feet to the nearest panel.

All power distribution feeders shall be in conduit, with copper conductors. Location of main service shall be centralized in the facility, nearby to large mechanical loads, to minimize feeder lengths for efficiency, sustainability, and cost savings.

All outlet circuits shall have dedicated neutrals with single pole breakers. Shared neutrals with two and three pole breaker handles are not allowed.

All circuits shall be designed so there is no more than 5% maximum voltage drop from the main service entrance to the outlet or device. It is preferred that the feeder have no more than 2% voltage drop, and the branch circuit no more than 3% voltage drop, at maximum connected load. This may be accomplished by increasing wire size, or minimizing distance of the feeders and branch circuits, as appropriate.

Power panels for receptacle power shall be separate from panels feeding mechanical and lighting loads to allow for easy, separate metering as required by the IECC and the High Performance Building Standard. Separation will also reduce harmonic transfer between building mechanical loads and receptacle power and can be considered part of the DFCM required Harmonic Mitigation Plan.

Power Quality and Harmonic Mitigation Plan

The design engineer shall detail a plan for power quality to meet the DFCM standards, including specifying low harmonic ballasts, harmonic filtering units for adjustable speed drives, power factor correction, and/or active harmonic filtering units. It should be noted that power factor correction in an individual building is not as important in a campus environment as long as the main substation power bill has no penalties paid to the power company. Testing of harmonics and power factor shall be required as part of the commissioning process.

Outlets

The number and location of outlets shall be coordinated with each space with users and comply with their needs and requirement. Outlets shall be avoided in residence rooms.

Arc flash breaker protection shall be used in all residence rooms, kitchens, dining rooms, restrooms and living areas. GFI outlets shall be provided for all vending machines and for kitchens, break rooms, restrooms, roof outlets, and other locations within 6 feet of a sink.

Outlets in residence rooms shall be protected with safety style duplex outlets, and be on contactors controlled by the staff. The rooms shall be washed down occasionally with water, so the designer needs to consider water protection and

still maintain vandal resistance. Measures such as mounting height, mounting position, water resistant cubbies, water resistant outlets, and water resistant device covers that are vandal resistant should all be considered. For example, a small cubby where the outlet is mounted on the upper part of the cubby facing downwards may protect the outlet from direct water spray. All outlets and covers shall be flush mounted. In no case shall standard flip covers or other covers that can be broken that are hinged be used.

Provide dedicated outlets for all copy machines, laser printers, vending outlets, microwaves, and other high-use equipment.

Provide at least one outlet in each storage and mechanical room where the room exceeds 20 square feet.

Lighting

There are two basic areas, each with separate needs:

Resident-Access Areas: Provide medium detention grade or vandal resistant light fixtures, with break resistant lensing, tamper resistant hardware, and LED sources for long maintenance intervals and for avoidance of lamp breakage. Flush mounted is preferred.

Accompanied and Non-Resident Areas: Provide standard modern office lighting, with fluorescent lamping. Vandal resistance is not required in these supervised areas. Modern diffuse, low glare lensing is preferred. LED may be used where dimming is necessary.

Wherever possible, the designer shall utilize long life, energy efficient lighting solutions. Solid State LED sources that save energy are preferred for certain downlights and for residence areas. Four foot T8 premium efficiency fluorescent lamps, with premium efficiency electronic ballasts, are preferred for office areas except where daylight dimming is required. T8 lamps shall be premium, greater than 3100 lumens. T8 ballasts shall be premium, high efficiency, with ballast factor less than 0.8.

Incandescent lamp sources shall be avoided.

LED solid state systems are encouraged. Careful consideration of color rendering, matching of batches, and possible sample fixtures shall be presented to the owner for approval. Avoid the use of two separate manufacturer products in the same room.

Lighting solutions shall incorporate automated controls per the latest version of the energy code. This can be time clock switching systems in public areas of the facility, and/or occupancy based switching systems in private offices, storage rooms, and office area restrooms. Dual technology occupancy sensors are preferred to help prevent false off and false on operation of the lights.

For residence areas, relay based lighting control is preferred, with an interface with the building automation which will allow a graphic interface for the staff. Residence rooms shall have master control through the staff desk, and with local tamper resistant key switches near the residence rooms (immediately outside). Note that ASHRAE 90.1 has exceptions to automated shutoff control such as occupancy sensors or relays where it will endanger occupants or staff, or where patient care is given. Design Engineer shall include commissioning specifications in the design to commission all lighting control systems, and provide required owner training.

Daylighting controls are required by ASHRAE where windows and skylights are located. Follow ASHRAE guidelines as they relate to size of windows, and daylight zoning for both skylights and windows. Avoid daylighting controls in residence rooms to avoid damage, and provide ceiling mounted or integral fixture mounting for the living area, dining area where daylight is present.

Provide egress illumination and illuminated exit signs complying with all required codes. As a minimum, 1 footcandle shall be provided for all egress pathways. Higher levels of emergency egress should be considered in the residence room area, recommended at 2-5 footcandles. In addition, provide some illumination on backup generator power in public restrooms, mechanical rooms, electrical rooms, and communications closets.

Illumination levels shall follow the published guidelines of the Illumination Engineering Society, North America (IESNA), and its recommended practices.

Grounding

Provide grounding equipment conductors in all feeder and branch circuits. Conduit ground is not acceptable. Provide grounding riser system for all telecommunications closets, complete with grounding bus bars.

Lightning Protection Systems

Lightning protection systems are not recommended on this residence facility.

Clocks

Not required.



Sustainable Principles

The new state High Performance Building Standard located in the appendix shall be followed.

It is desired that where economically feasible, sustainable practices and design shall be employed regardless of whether or not the practice matches the standard. Many of the above system descriptions already use energy efficient design practices.

INFORMATION TECHNOLOGY, AV AND SECURITY

Telecommunications Service to New Facility

A fiber optic ductbank has been installed from a central telecommunications room near the east side of campus. The locations nearby the construction site include a ductbank near the maintenance building, north and east of the construction site, and a ductbank south of the Auditorium building. The contractor is responsible for installing the infrastructure to provide telecommunications service to the new building from one of these two locations, following State of Utah Department of Technology Services (DTS) standards and coordinating with DTS during design. DTS will provide and install the fiber optic cabling.

Telecommunications Trunklines Within New Facility

It is proposed that a new Main Distribution Frame rack (MDF) be located centrally in the building to accommodate short runs. Distance shall be under 100 meters to any workstation outlet. If one room is not sufficient, then add an Intermediate Distribution Frame room (IDF).

Telecommunication MDF and IDF Room Requirements

All MDF rooms shall have appropriate grounding, and grounding bus, tied back to the power service ground. Provide grounding jumpers to all metal raceways entering the closet. Provide spare holes on grounding bus.

Horizontal Workstation Cabling Requirements

Wiring shall consist of category 6 cabling to each phone/data outlet throughout the facility. The State of Utah Department of Technology Services (DTS) will provide and install the category 6 cabling. The contractor shall install the infrastructure for the cabling system, including conduit raceway, per DTS standards. During project design, the contractor must coordinate data room, cabling and infrastructure locations and requirements with DTS.

TV

A satellite TV broadband RF system is anticipated throughout the facility, including to the gathering areas and conference areas of the facility. Provide appropriate coaxial cable, amplifiers, taps, and other equipment for a complete system. In addition, a TV digital signal over category 6 cabling is anticipated.

Audio Visual

The conference room shall have a laptop connection, with a flat screen TV. In the classroom, cameras and distance learning recording are not anticipated.

Security

Security card access shall be provided at the facility exterior doors. Security card access shall also be provided at the Medications room.

1. Main entry, service entry and any other exterior doors
2. Outdoor Recreation Area access doors
3. Medications room

CCTV on the exterior shall be provided at the locations noted below. Provide weather resistant domes and heaters for antifogging. CCTV on the interior shall be provided in the locations noted below. Living area cameras shall not invade private areas such as the individual bedrooms, restrooms and shower rooms.

Exterior:

1. Parking areas
2. At each building entry
3. At least one in each Outdoor Recreation Area
4. At least one on all sides of building

Interior:

1. Main entry door vestibule (so those entering the building can be viewed)
2. Main corridors throughout the building, including Residential Pods
3. One at each Residential Pod living room, dining room, electronics area and Time-Out Room

A duress/assist button system shall be provided. The system shall consist of permanently mounted buttons at the reception desk, and wireless tether buttons to be worn on each person assisting residents. A local alarm shall be provided in the office and near staffing areas.

6 | APPENDIX

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Utah State Developmental Center

Admissions & Safe Housing Program

1. Project Information

- A. Project Name: Utah State Developmental Center Admissions & Safe Housing
- B. Project Site Address: 895 North 900 East, American Fork, Utah 84003
- C. Building Type: Admissions and residential facility for individuals with intellectual disabilities
- D. Project Team Contact Information:
 - a. DFCM Project Manager: Lucas Davis (801) 842-8210 lucasdavis@utah.gov
 - b. DFCM Energy Prog. Dir.: John Burningham (801) 641-7270 johnburningham@utah.gov
 - c. Agency Project Manager: Mack McDonald (801) 538-4485 mackmcdonald@utah.gov
 - d. DFCM Energy Consultant: Spencer Howell (801) 530-3148 mackmcdonald@utah.gov
 - e. DFCM Exterior Envelope Consultant: Architectural Testing (ATI)
 - i. Don Rasmussen (385) 229-4980 drasmussen@archtest.com
 - f. DFCM Commissioning Consultant: McKinstry
 - i. Josh Harwood (303) 215-4051 joshh@mcinstry.com
 - ii. Lin Alder (435) 632-8433 lina@mcinstry.com
 - g. Program Architect: MHTN Architects, Inc.
 - i. Kyle Taft (801) 326-3204 kyle.taft@mhtn.com
 - ii. Sarah Miller (801) 326-3203 sarah.miller@mhtn.com
 - h. Program Mechanical Engineer: Van Boerum & Frank Associates, Inc.
 - i. Kim Harris (801) 530-3148 kharris@vbfa.com
 - i. Program Electrical Engineer: Ken Garner Engineering, Inc.
 - i. Ken Garner (801) 328-8800 ken@kengarner.com
 - j. Program Structural Engineer: Reaveley Engineers & Associates
 - i. Mark Harris (801) 486-3883 mharris@reaveley.com
 - k. Program Civil Engineer: Great Basin Engineering, Inc.
 - i. Mark Babbitt (801) 394-4515 markb@greatbasinengineering.com

2. Project Background

- A. General Information & Background: This project is a durable housing facility for the Utah State Developmental Center in American Fork, Utah. The Developmental Center serves people with developmental disabilities of all types. The durable housing facility will serve newly admitted residents and also residents who require more secure and durable housing. The initial facility project will provide three residential pods of twelve beds each, at a total of about 22,000 GSF. The USDC anticipates adding a fourth 12-bed pod in the near future; the initial facility design and systems capacity must accommodate the future addition (future total facility GSF: about 28,000). The facility will be constructed on an unoccupied site on the USDC campus. Project construction budget is \$5,230,871.
- B. Mission & Objectives:
 - a. Provide facilities that will allow a simplified and streamlined admissions process.
 - b. Provide safe, secure and high-durability housing which fully supports the treatment philosophy of the Developmental Center.

3. Codes & Standards

- A. Building Codes:
 - a. 2012 edition of the International Building Code (IBC), to include Appendix J, issued by the International Code Council.
 - b. 2011 edition of the National Electrical Code (NEC), issued by the National Fire Protection Association.

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- c. 2012 edition of the International Plumbing Code (IPC), issued by the International Code Council.
- d. 2012 edition of the International Mechanical Code (IMC), issued by the International Code Council.
- e. 2012 edition of the International Residential Code (IRC), issued by the International Code Council.
- f. 2012 edition of the International Energy Conservation Code (IECC), issued by the International Code Council.
- g. 2012 edition of the International Fuel Gas Code (IFGC), issued by the International Code Council.
- h. Utah State Amendments, which can be found on the DFCM website: http://dfcm.utah.gov/downloads/bldg_official/codes_in_use.pdf
- B. DFCM Standards:
 - a. Design Process, web address: http://dfcm.utah.gov/downloads/design_manual/design_process.pdf
 - b. DFCM Design Requirements, June 11, 2009, web address: http://dfcm.utah.gov/downloads/design_manual/design_requirements.pdf
- C. Agency Standards:
 - a. *Utah Administrative Code R432, State of Utah Health Facility Rules*
 - b. *Guidelines for Design and Construction of health Care Facilities, The Facility Guidelines Institute, 2010 Edition; Parts 1, 4 and 6*
- D. Other:
 - a. Facility design and any requested variances will require review and approval by:
*Utah Department of Health
 Family Health and Preparedness, Licensing
 Cannon Health Building
 288 North 1460 West
 Salt Lake City, Utah 84116-3231
 Andrew Baxter (801) 538-6140 andrewbaxter@utah.gov*

4. High Performance Building Concepts & Goals

- A. The State of Utah High Performance Building Standard, Section 5.0, has been modified for specific applicability to this project (construction budget of \$5.2 million; design-build delivery). See program Appendix B.

5. Indoor Environmental Quality

- A. Views: Exterior views and daylight are desired for the majority of occupied spaces (see program Room Data Sheets).
- B. Daylighting: Exterior views and daylight are desired for the majority of occupied spaces (see program Room Data Sheets).
- C. Outside Air: ASHRAE 62.1
- D. Ventilation: ASHRAE 62.1
- E. Lighting Levels:

Office Lighting:	50 FC
Storage Rooms:	20 FC
Conference Room:	35 FC (continuous dimming and zoned preset)
Classroom:	50 FC (continuous dimming and zoned preset)
Staff Lounge:	30 FC
Staff Shower:	20 FC (30 FC at shower and lavatories)

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Corridor lighting	15 FC
Lobby/Waiting room lighting	30 FC
Secretary/Reception lighting	40 FC
Visiting Room lighting	30 FC
Restroom lighting	20 FC (30 FC at lavatories and toilets)
Resident Bedroom lighting	30 FC at bed and desk, 10 FC elsewhere
Living Room	30 FC
Electronics Area	20 FC
Dining Room	20 FC
Kitchen	70 FC
Resident Laundry	30 FC
Medications	70 FC
Time Out Room	20 FC
Egress lighting	2 FC (twice as much as code required)
Exterior Lighting pathways	1 FC
Exterior entryway to building	3 FC
Exterior security perimeter	0.25 FC (measured within 20 feet of building perimeter wall)

6. Space Program

- A. Occupancy Schedule: The residential pods of this facility (about 80% of the total GSF) will be occupied and in use at all times. The Central Core (about 20% of total GSF) will be in use primarily during the hours of 7 AM to 6 PM.
- B. After Hours Schedule: Residential pods – no “after-hours”. Central Core – after-hours defined as 6 PM to 7 AM.
- C. Cleaning Schedule: Residential pods – cleaning can occur at any time. Central Core – cleaning will occur during after-hours period.
- D. Set Points: Summer 75° F (adjustable)
Winter 72° F (adjustable)

7. Electrical & Lighting Criteria

- A. Per Space Program:
- B. Light Power Density (LPD): 0.7 watts/SF or better
- C. Footcandle Levels: See section 5E
- D. Controls:
 - a. Office Lighting: Occupancy sensors, ceiling mounted
 - b. Resident Area Lighting: Manual keyed switches local, central relay system with graphical user interface (building automation system)
- E. Daylighting:
 - a. Office Lighting: Daylighting zones as per ASHRAE 90.1 with continuous dimming in select areas such as the conference room and public areas.
 - b. Resident Area Lighting: Daylighting zones in resident living and dining rooms.
- F. Outdoor Views:
 - a. Office area shall have views from each office.
 - b. Resident Area shall have views from Living and Dining Room. Resident Bedrooms shall have security windows as per program, and applicable codes and guidelines.
- G. Lighting Strategies:

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- a. Office Area: Fluorescent in private offices and storage rooms, except where dimming is employed LED shall be utilized.
- b. Resident Area: LED shall be used throughout, with medium security grade in resident bedrooms, toilet rooms and shower rooms, and vandal resistant construction elsewhere.
- H. Special Resident Area Requirements:
 - a. Outlets shall employ Safety style duplex receptacles to prevent tampering, along with arc flash breaker protection as per NEC code requirements.
 - b. Outlets within the resident rooms shall be run through contactors and be controlled by staff with key switches. Provide spray-down water resistant protection.
 - c. Local Lighting control switches in the resident areas shall be keyed style, with reporting through a graphical user interface on the building automation system to show which lights are on and which are off. The graphical user interface shall also control the lights on and off.
 - d. Fire alarm detectors shall be through a VESDA Very Early Smoke Detection system tubing to prevent tampering and provide vandal resistance. Pull stations shall be keyed.
 - e. All electrical items shall be hardened and vandal resistant.
- I. Exterior Requirements: Security lighting shall be on around the building all night. For exercise yard (Outdoor Recreation Area), provide higher illumination and control the light on and off through keyed switches and sweep off.
- J. Emergency Requirements: Diesel emergency generator for egress lighting, telecommunications, security system and fire alarm system backup, kitchen food storage and prep areas, and resident living and toilet/shower rooms.
- K. UPS: Provided as part of the telecommunications vendor package (by owner).
- L. Distribution: 120/208 3 phase
- M. Metering: Building service entrance metering only. Provisions for future lighting metering by placing lighting circuits on separate panelboards.

8. Mechanical Criteria

- A. Design Conditions:

	Summer	Winter
Design Temperatures, Dry Bulb	97° F	0° F
Design Temperatures, Wet Bulb	62° F	-
Site Elevation: 4606 feet		

Typical Indoor Design Conditions:

Summer	75° F
Winter	72° F
Humidity	Humidification is not required for this facility
- B. Acoustical Isolation Criteria: None
- C. Pressurization: Building shall be maintained at a positive pressure
- D. Humidity: None
- E. Controls: DDC, connect to campus BAS, Yamas
- F. Metering: Steam
- G. Analytics: Provided through the BAS
- H. Equipment Types: Heat pumps, VRF, Four pipe fan coils, or VAV reheat

9. Building Automation System (BAS) Requirements

- A. Accessibility: As determined by user and maintenance personnel
- B. Type: DDC

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- C. Integration: Provide DDC integration to all equipment such as heat pumps, VFDs, etc.
- D. Metering: Steam

10. Security Criteria

- A. Exterior Security Cameras: Fixed CCTV cameras located exterior, with coverage at parking, building entrances, outdoor recreation areas and at least one camera on all sides of the building (approximately 80% coverage).
- B. Interior Security Cameras: Fixed CCTV cameras at: main entry door vestibule; down major hallways at residential pods and throughout the building; in residential pod living, dining and electronics rooms; and Time-Out Room.
- C. Card Access System: Card access located on all exterior doors, including each Outdoor Recreation Area access door, and at the Medications room door.

11. AV Criteria

- A. Conference Room: Laptop connection HDMI, flatscreen TV
- B. Electronics Area: Large flatscreen TV, surround sound audio, video game connection, DVD connection, satellite and / or cable TV connection, data media connection
- C. Living Room: Large flatscreen TV, surround sound audio, DVD connection, satellite and/or cable TV connection, data media connection:

12. Integration into Existing Campus Systems

- A. All central HVAC equipment including heat pumps, heat exchangers, pumps, variable speed drives and exhaust fans.
- B. All decentralized HVAC equipment such as thermostats, meters, air and water temperature sensors, system pressure sensors.
- C. Provide interface modules as necessary in order to provide communication and information from manufactured equipment such as heat pumps and VFD's.
- D. The control system shall be connected to the campus Yamas network or the campus telecommunications Ethernet network.

13. Acoustical Criteria

- A. Per Space Program: The Time-Out Room, program space B116, can be a noise-generating space; locate this space and/or use separation and sound absorption to contain the noise so that it does not disturb residents in adjacent areas.
- B. Internal Considerations:
 - a. Resident bedrooms should have a high degree of acoustical separation from adjoining rooms or spaces.
 - b. Offices and conference rooms should have a high degree of acoustical separation from adjoining rooms or spaces.
- C. External Considerations: There are no unusual criteria or considerations.

14. Building Envelope

- A. Vapor Barrier: A Class I or Class 2 continuous vapor barrier (or vapor retarder) must be provided to all exterior opaque walls, roofing, below grade foundation walls and slabs, and slab-on-grade conditions as determined by appropriate hydrothermal analysis. Mechanically fastened barriers are not acceptable. This vapor barrier shall be sealed at all interfaces, fenestrations, penetrations, exterior light fixtures, etc. A vapor barrier (or vapor retarder) is defined as materials with vapor permeability below 1.0 perm per ASTM E96 desiccant or dry cup method (Class I or Class II per 2012 IBC).

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- B. Masonry: Mortar Joints shall be "concave", "V-joint" or "weathered raked" for structural members and surfaces exposed to weather. When CMU forms the substrate for an air barrier or coating, mortar joints shall be struck flush. The exposed face of all embed plates shall be set flush with the face of masonry wall or column.

All masonry anchors should be installed prior to installation of the exterior air barrier, such that the penetration of the air barrier can be evaluated prior to concealment. Anchors applied after the air barrier shall include sealant applied to the threads prior to installation and sealant applied over the fastener head, under the fastener head, under the anchor, and additionally detailed per the air barrier manufacturer recommendations. Fastening anchors through insulation and then through the air barrier blindly is not permitted on High Performance Structures. For all High Performance structures, the performance expectations of the veneer ties should meet or exceed the life expectancy of the building.

- C. Insulation: All buildings with exterior insulation within a masonry cavity shall utilized mechanical attachment in conjunction with the lateral masonry anchors, such as insulation washers, as a secondary means of secured attachment for the exterior insulation. Insulation attachment shall be installed in a manner to prevent the attachment from becoming dislodged due to the long term expansion and contraction of the insulation material.
- D. Glazing: Glass areas shall be reasonably minimized to conserve energy during winter and summer. Glazing area in excess of prescriptive table allowances of IECC or ASHRAE 90.1 shall be reviewed by the BECxA and approved by DFCM. Higher SHGC or U-Factor (lower R-Values) than those required in the IECC and ASHRAE 90.1 prescriptive tables shall not permitted without review by the BECxA and DFCM and approval by DFCM. Aluminum thermally broken frames and sashes are to be used in all windows. Wood or steel is not acceptable. Standard Performance structures shall utilize windows with a minimum performance rating of CW40 per AAMA 101-2011 North American Fenestration Standard/Specification for Windows, Doors, and Skylight; High Performance structures shall utilize a minimum performance rating of AW40. Design Build team to demonstrate Glazing system(s) continuity to air/vapor barrier at all head, jams and sill locations.
- E. Below-Grade Waterproofing: The system must be designed as follows:
 - a. Relieve hydrostatic pressure on substructure walls and allow water drainage to the level of the drain.
 - b. Membrane waterproofing must be fully bonded to the substrate and seamless.
 - c. Below-grade waterproofing must be applied to the positive pressure side and must be covered by a protection drainage and protection course.
 - d. In the presence of water table, completely encapsulate the structure in waterproofing and drainage medium to minimize hydrostatic head.
- F. Testing: Whole Building Air Testing may be performed on this project (as determined by DFCM) in accordance with USACE (United States Army Corp of Engineers) air leakage standard rate of .25 cfm/sf envelope area. The Design-Build team is to provide the BECx consultant an area calculation of the building envelope area 2 weeks prior to testing date. Contractor to provide access to all areas of the building. Contractor to coordinate with the mechanical contractor to a) be present during the test b) shut off all mechanical equipment c) mask off (prevent air leakage) through mechanical equipment d) assist in determining air leakage during testing activities (should this occur) and e) return mechanical equipment to normal operating condition at the conclusion of the test.

15. Life Cycle Expectations & Quality

- A. Building Lifespan: 50 years
- B. HVAC Lifespan: 20 years
- C. LCCA Period and Inflation: 20 years

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16. Post Occupancy & Warranty

- A. 10 Month Walk Through: This will be required.
- B. Building Performance Review: A 5 month Building Performance Review will be required to assess possible building performance problems and seek appropriate resolutions as necessary. Attendees to include the following.
 - a. General Contractor
 - b. Mechanical Contractor
 - c. Electrical Contractor
 - d. Design Engineers
 - e. DHS Facility Operator
 - f. DFCM Energy Program Director
 - g. Energy Engineer
 - h. Commissioning Agent
- C. The Commissioning Agent (CxA) in conjunction with the DHS Facility Operator is to set up an account in EPA's ENERGY STAR Portfolio Manager to be utilized for building benchmarking.

17. Systems to be Commissioned

- A. HVAC:
 - a. Primary ventilation equipment
 - b. Exhaust equipment
 - c. Heating and cooling systems
- B. Electrical:
 - a. High voltage switchgear
 - b. Building transformer
 - c. Generator
 - d. Lighting occupancy controls.
 - e. Lighting daylight dimming controls.
- C. Controls:
 - a. Lighting controls
 - b. HVAC controls
- D. Life Safety:
 - a. Fire alarm and VESDA system
 - b. Smoke and fire damper inspection
- E. Security:
 - a. Closed circuit television system
 - b. Access control system
- F. Plumbing:
 - a. Domestic hot water system
- G. Telecom:
 - a. Connection to central campus system (fiber)
 - b. Dedicated cooling systems

18. Operations & Maintenance

- A. Requirements and Expectations by Facility Operators:
 - a. Systems should be designed to have minimal maintenance requirements. This is especially true of terminal systems in general areas and resident rooms.

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- b. Equipment should be "walk-up" accessible.
- c. Control system interfaces should allow for remote technical support and control of all primary building systems. The integrations should allow remote users to have sufficient information for troubleshooting.
- d. Building automation / control system should have easy to use graphical interface that does not require a mechanical expert to operate. System to be used for lighting status and control in the resident area.
- B. Systems Training and Manuals Required:
 - a. Training should be conducted in progressive logical fashion and should include at a minimum:
 - i. Training on system components
 - ii. Training on systems
 - iii. Training on system interactions
 - b. Minimum training of 2 hours' duration on all systems, such as lighting graphic interface control, security alarm, and fire alarm systems. Training to be video recorded and captured for future reference.
 - c. Training to be provided at substantial completion and again at the 5 month Building Performance Review.
- C. Preventive Maintenance:
 - a. Lighting: Use long life and low maintenance LED lighting technologies at locations indicated and for dimming areas.

19. Strategies to Reduce Single Vehicle Ridership to and from the Facility

- A. USDC will encourage staff to use campus eco passes and/or campus carpool program.
- B. Provide shower/changing facilities that can be used by bicyclists and those who exercise mid-day.
- C. Designate a minimum of two parking stalls for carpool and/or low-emitting/fuel efficient vehicles, located in preferred parking locations.

20. Project Team Responsibilities to Support HPBS Goals & Strategies

- A. Design Team: Design team must submit review sets to the Facility Operators at the end of each design phase.
- B. Facility Operators (Design Phase): Facility Operators must provide design phase submittal review comments to the Design Team in a timely manner.
- C. Systems Meetings: Early design phase meetings in which building systems are to be discussed for systems selection must include the Facility Operators, Energy Engineer, and Commissioning Agent.
- D. Controls Review Meeting: Prior to the release of the final bid set, a controls review meeting with the Facility Operators, Energy Engineer, CxA, Controls Contractor and Design Team must be held to review building controls and proper sequencing.
- E. Facility Operators (Post Construction): Maintain and operate the systems properly. Monitor systems performance to be aware of any drop in performance/ efficiency.

21. Budget Considerations

- A. Balancing Efficiency, Quality, Budget, Comfort and Maintenance:
 - a. This project will not include an energy model; however, the requirements contained in the project program are intended to guide the appropriate balance for these elements.
 - b. The DFCM has hired consultants who will assist the project in all its phases (Energy Engineer, Commissioning Agent, and Building Envelope Commissioning Agent). They will provide qualitative input to the design team during design to assist with these issues.

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5.0 High Performance Building Standard

- A. The State of Utah Division of Facilities and Construction Management require each project meet a sustainable design standard. All projects must meet the following standards.
- B. In the case where a conflict arises between different sections, the more stringent requirement should apply and the Department of Facilities and Construction Management (DFCM) should be notified about the conflict.

5.1 Integrated Design Process

A. General Intent

- (1) The process and expectations outlined in section 5.1 includes certain activities and events that are required to happen during the project. Many of the activities are not required, but their inclusion is based upon the experience of DFCM and professionals that serve DFCM. The intent thereof is to inform the project team of what should happen over the course of a project to not only meet the requirements of the HPBS but also maximize the value of design and construction efforts to DFCM and the State of Utah.
- (2) Adjustments to the process outline below, in order to best suit the needs of each project, are expected and should be discussed with the project team periodically through the project and recorded in the OPR.
 - a. The Owner shall directly hire the Energy Engineer, Building Envelope Commissioning Agent, and Commissioning Agent in the programming phase.
 - i. For Design Build projects the Energy Engineer shall provide the Energy Engineering over the course of the entire project as part of the design build team.
 - b. The Owner, Energy Engineer, Commissioning Agent, and Building Envelope Commissioning Agent, shall provide timely input to the design team related to the OPR, BOD, and related HPBS documentation.
 - c. An updated BOD and OPR, including narrative of HPBS goals and strategies, shall be included in each design phase submittal to the owner. Changes from one phase to the next shall be documented as to provide a record of the development of the project.
 - d. An updated sustainable site plan shall be included in each design phase submittal to the owner
 - e. A HPBS Workshop must be completed during the first half of each phase of the project. Goals, strategies, and performance metrics must be documented in the OPR, BOD, and project documents accordingly. Additional informal HPBS Workshops shall be held to provide clear direction to the project in regards to the requirements of the HPBS
 - i. As coordinated by the design team and DFCM Energy Program Director, each HPBS Workshop shall include, but not limited to, the following project team members.
 - I. Design team members
 - II. Owner
 - III. Agency Project Manager
 - IV. DFCM Project Manager
 - V. Agency Energy Manager

- VI. DFCM Energy Program Director
- VII. Facilities Operators, if unknown at the time, it must be clearly identified who will be in attendance to represent the interests of facility operations
- VIII. Energy Engineer
- IX. Commissioning Agent
- X. User group representative(s)

- ii. For design build projects these required workshops must be held after the winning team has awarded the project.

- f. The Owner, design team, Energy Engineer, Commissioning Agent, and Building Envelope Commissioning Agent shall review each design phase submittal for compliance to the HPBS. Appropriate design phase comments shall be provided to the design team within 10 business days.

- g. The design team shall conduct a building envelop systems meeting, during design development and construction documents phases, to review possible envelope strategies. Topics to review included, but are not limited to, air, thermal and moisture performance, functional performance requirements, constructability, energy efficiency, aesthetics, mock ups, and testing.

B. Schematic Design

- (1) The following must be provided during the schematic design phase of the project.

- a. The design team shall conduct a building systems meeting to review the possible systems applicable to the project. Agenda items to include, but not limited to, performance, LCC, first costs, operations and maintenance, and existing infrastructure integration.
 - i. The design team, appropriate Facilities Operators, Commissioning Agent, Agency Energy Manager and or DFCM Energy Program Director, General Contractor and appropriate subcontractors (if hired), and Energy Engineer must be in attendance.
 - ii. This meeting is required once the design build winning team has been awarded the contract prior to the end of schematic design.
- b. DFCM Energy Program Director to sign Rocky Mountain Power's Incentive General Applications as provided by Architect
- c. The Cost Estimator or General Contractor/Construction Manager must provide relevant supporting construction cost estimates to the Energy Engineer and Design Team in a timely manner.

C. Design Development

- (1) The following must be provided during the design development phase of the project

- a. The design team shall conduct a second building systems meeting to review the possible systems applicable to the project. Agenda items to include, but not limited to, performance, LCC, first costs, operations and maintenance, and existing infrastructure integration.
 - i. The design team, appropriate Facilities Operators, Commissioning Agent, Agency Energy Manager and or DFCM Energy Program Director, General Contractor and appropriate subcontractors (if hired), and Energy Engineer must be in attendance.

D. Construction Documents

- (1) The following must be provided during the construction documents phase of the project.
 - a. The design team shall conduct a building controls meeting to review the possible systems applicable to the project. Agenda items to include, but not limited to, metering, controls, points, analytics and operations and maintenance.
 - i. The design team engineers, appropriate Facilities Operators, Commissioning Agent, Agency Energy Manager and or DFCM Energy Program Director, General Contractor and appropriate subcontractors (if hired), must be in attendance.
 - b. The Design Team shall coordinate all incentives and rebates as outlined in section 5.14.
 - c. The Design Team shall submit all required documentation to DFCM as part of the CD submittal. The submittal shall include, but is not limited to the following.
 - i. Sustainable site plan
 - ii. HPBS Spreadsheet
 - iii. Any exceptions and appeals
 - iv. Owner's Project Requirements
 - v. Basis of Design
 - d. The CxA shall submit all required documentation, per section 5.12, to DFCM as part of the CD submittal
 - i. Commissioning Plan

E. Bidding

- (1) Value engineering efforts and substitution request must be evaluated in context of the HPBS, preferred operations and maintenance procedures and performance impacts over the life of the building.
- (2) The General Contractor shall account for HPBS requirements including, but not limited to, functional testing, building envelope function performance testing, and building flush out, in the construction schedule.

F. Construction

- (1) Submittals and shop drawings related to HPBS requirements shall be reviewed by the CxA, BECxA and Energy Engineer in the time period set forth in the construction documents. Their review does not relieve or supersede the responsibility of the design team to review the HPBS related submittals and shop drawings for compliance set forth in the construction documents.
- (2) The Design Team shall provide the required incentive and rebate documentation to the DFCM Energy Program Director as outlined in Section 5.14 and related appendices
- (3) BECx related performance tests shall be tracked in the weekly OAC meeting minutes.
- (4) At a minimum, the BECxA shall attend, in person or via a conference call, OAC meetings monthly. Reasonable effort by other team members shall be made to discuss related issues at the beginning of each meeting
- (5) A building envelope commissioning kick off meeting shall be coordinated by the general contractor and BECxA.
 - a. Required attendees include, but are not limited to the following: Architect, DFCM Energy Program Director. Subcontractors responsible for the following building components shall attend when applicable; masonry, insulation, air barrier, cladding, glazing, roofing and others as dictated by the envelop design.

- (6) Testing of building envelope components, on the building mock up, shall be completed with acceptable results prior to installation of said components.
 - a. The general contractor and subcontractors responsible for the installation of the components shall attend the functional testing
 - b. The BECxA shall review deficiencies and possible causes of failed tests with each subcontractor prior to leaving the site on the day of the test(s).
- (7) At a minimum the Commissioning Agent shall attend, in person or via a conference call, OAC meetings on a month basis.
- (8) A building systems commissioning kick off meeting shall be coordinated by the general contractor and CxA

G. Substantial Completion and Project Closeout

- (1) The CxA shall coordinate with the agency Energy Manager to set up the project for benchmarking in EPA ENERGY STAR Portfolio Manager.
 - a. The agency Energy Manager shall report the ECI, EUI, GHG emissions and water used per EPA ENERGY STAR Portfolio Manager in its annual energy report to DFCM.
- (2) The CxA, Owner, and General Contractor shall conduct a Four Month Walk Through Performance Walk Through meeting.
- (3) The CxA shall finalize the incentive and rebates per section 5.14
- (4) The O&M manuals and As-Built documents must include, but is not limited to, the OPR, BOD, HPBS Worksheet, Controls As-Built.

5.2 Context Sensitive Design**A. Site Design**

- (1) The Design Team shall conduct a review of the local and regional planning documents pertinent to the project. These documents may include, but are not limited to:
 - a. Municipal Master Plan or Land Use Plan
 - b. Applicable Open Space Plans, including trail and recreation plans, and municipal open space plans.
 - c. Municipal, Regional or State Transportation Plan
 - d. Local or Regional Stormwater Plans or Guidelines
 - e. Applicable environmental regulations that may apply to the site
- (2) The project design shall reflect the community vision for the site. The building site, open space design and access points shall reflect the goals of the regional and municipal planning documents.

B. Building Design

- (1) The building shall be sited and oriented to reflect the community development patterns and vision, while responding to the site, solar access, and other climate considerations.
- (2) The building design shall reflect the community vision and vernacular design patterns.

C. The facade design shall reflect the solar access and orientation of the site through the integration of shading devices, window location, and scale. Window to wall ratios that are appropriate based on building energy performance, orientation, and interior programming shall be integrated into the design.**D. Access**

- (1) Provide enhanced access from the project entry to the identified pedestrian and transit access points at the perimeter of the site.
 - a. Ensure pedestrian paths are safe, accessible and maintainable by facility staff



- (2) Separate pedestrian paths from vehicular paths with landscaped barriers to the extent feasible.
- (3) Identify key paths on a Sustainable Site Plan drawing submitted at the Schematic, Design Development, and Construction Document phases.

5.3 Transportation Management

- A. Identify transportation management goals for the project to help reduce single rider vehicle impacts. This goal may be an overall percentage reduction in single-vehicle ridership, an increase in transit usage or the implementation of a carpooling program. Record these goals in the OPR.
- B. Define clear, safe paths of access for pedestrians and cyclists from the public right-of-way to the building entry. Locate shower and changing rooms - as applicable - near these locations.
- C. Provide a minimum of 10 secure bicycle storage locations.
 - (1) After the course of one year Facility Operators shall assess the need to for additional bicycle storage racks and provide as necessary.
 - (2) If the project cannot or should not meet the above requirements, provide a written justification in the OPR.
- D. Provide a minimum of two reserved parking stalls for carpool vehicles and fuel-efficient, low emitting vehicles on each project.
- E. Implement three of the following strategies to reduce single vehicle ridership to and from the project.
 - (1) Identify transit and alternative transportation options for the users and site. Identify strategies to encourage transit ridership, such as reduced or free pass offerings.
 - (2) Incentivize transit use through increased parking fees or paid parking lots.
 - (3) Provide telecommuting and / or reduced work week programs to minimize single vehicle ridership to the building.
 - (4) Provide shower and changing room(s) for cyclists and those who exercise mid-day.
 - (5) Designate 5% or more of the total parking provided as parking stalls for low emitting/fuel efficient - locate these stalls in preferred parking locations.
 - (6) Provide alternative fuel stations as applicable for the project.
 - (7) Designate 5% or more of the total parking provided as parking for carpool vehicles- locate these stalls in preferred parking locations.
 - (8) Demonstrate single-vehicle ridership or vehicle impact reductions through an alternative method.
- F. The three strategies shall be identified in the OPR and included in the Education and Outreach program for the building users and visitors.

5.4 Site Design

- A. Open Space Design
 - (1) Create an open space plan that defines the usable site areas, designates open space, and identifies the landscape and hardscape areas. These specific areas shall be shown on the Sustainable Site Plan drawing, include a brief description of the anticipated level of use of each of the areas, and submit with each design review phase.
 - (2) Necessary pedestrian open spaces such as sidewalks, paths, and passive and active recreation areas, shall be designated. Include transportation management areas as indicated in section 5.3
 - a. Define active hardscape areas that will be used for pedestrian traffic or regular pedestrian or visitor use.

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- b. Define active landscape areas that will be used by building users and visitors regularly. Identify intended uses that may occur within this landscaped area.
 - i. Turf shall only be used at active landscape areas that are a minimum of fifteen feet in any direction and a minimum of 200 square feet. Exceptions to this shall be justified by local landscape and/or zoning standards. Any alternate use must be reviewed and approved by the DFCM Energy Program Director.
- c. Define aesthetic and native or natural open-space areas, as applicable
- d. Define active pedestrian hardscape areas that are used for emergency or non-active uses
- (3) The Landscape Architect shall provide an estimated maintenance schedule for the landscaped areas, with an emphasis on the reduced maintenance and reduced water consumption of the native and adapted landscaped areas.
 - a. This maintenance schedule shall be included in the Operation and Maintenance Manuals for the project.
- B. Landscape Water Consumption
 - (1) Create a site irrigation water use budget based on your location and site conditions, per the EPA Water Sense criteria.
 - a. Use the EPA WaterSense Tool¹ to identify the water allowance for the site after landscaped areas have been defined. A summary of the water allowance shall be included in the Operations and Maintenance Manuals for the project.
 - (2) Landscape water consumption shall be at or below what is identified as the monthly water allowance for the site by the EPA WaterSense Tool. Justification for exceeding monthly water reviewed and approved by the DFCM Energy Program Director. Design and implement landscape materials and features that respond to the allocated water budget identified in section 5.4.B.1 and meet the native and adapted landscape material requirements.
 - (3) Landscape features shall align with the anticipated use areas defined in the in section 5.4.A. Integrate an EPA WaterSense Labeled irrigation controller into the irrigation system.
- C. Storm Water Design
 - (1) Design, construct, and maintain storm water BMPs that manage rainfall on site and prevent the off-site discharge of precipitation from the first one inch of rainfall from a 24-hour storm preceded by 48-hours of no measureable precipitation.
 - (2) Implement at least two BMPs from the Best Management Practices for Storm Water²
 - a. Provide two BMP Information Sheets from the Guidance Document and a description of how the specific BMPs are implemented in the project.
 - b. Identify and describe the selected strategies in the OPR, and submit with the Design Development submission.
 - c. Implement one additional site performance standard as identified in items 2 through 5 on page 7-4 of the Storm Water Management Guidance Document.

¹ http://www.epa.gov/WaterSense/water_budget/

² Salt Lake County Engineering and Flood Control – Guidance Document for Storm Water Management – January 2012; Chapter 7. <http://www.pweng.slco.org/stormwater/pdf/longswplan.pdf>

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D. Heat-Island Effect

- (1) Plan exterior hardscape materials to reduce the urban heat island effect. Use materials with an SRI of 35 or greater for all pedestrian oriented paved surfaces and reduce the overall use of asphalt as feasible.
 - a. Reduce the dimensions of 25% of parking stalls to meet compact stall requirements of 8'-6" in width and 16'-0" in length. Provide either signage or striping to indicate the compact vehicles stalls on the site.
 - i. Indicate the compact parking on the Sustainable Site Plan drawing.
 - b. Use concrete at all pedestrian oriented hardscape areas. Colored concrete shall not have an SRI of less than 29.
- (2) Use reflective roofing to reduce the urban heat-island effect at the building. Install a reflective roof with an SRI of 78 or greater over 75% of the low slope roof areas (slopes below or equal to 2:12) for all buildings in Climate Zones three and five.
 - i. Consider a tan colored, planted or ballasted roof at roofs that are visible from inside the building to reduce glare and increase occupant comfort.
 - ii. Darker roofs shall be considered in climate zone 6, where heat absorption may be beneficial to the overall energy use of the building.
- b. Install roofing with an SRI of 29 or greater at steep-sloped areas (slopes above 2:12)
- c. SRI values for roofing and hardscape must be included in the Sustainable Site Plan.

E. Light Pollution Reduction

- (1) Use fixtures that as low in height as feasible, to ensure light is at the appropriate location for pedestrian safety and functionality.
- (2) All exterior lamps shall be LED.
- (3) Lighting values greater than 0.01 fc shall not extend beyond twenty feet over the defined site boundary, except as required by the municipality for pedestrian safety.
- (4) Exterior lighting shall be controlled by a photocell sensor.

5.5 Energy

- (1) Programmed basis of design values have been selected which, when followed prescriptively, will achieve 15-20% energy cost performance over ANSI/IESNA/ASHRAE Standard 90.1-2010. For the purposes of showing acceptable performance, values of envelope assemblies, mechanical systems and equipment, plumbing systems, and electrical systems and equipment will meet or exceed the values listed in the applicable sections of this document.
- (2) The Design-Build team may use alternates to the basis-of-design (BOD) assemblies and equipment. Should alternates be proposed, sufficient supporting documentation will be provided showing comparable energy performance to the BOD. Supporting documentation for proposed alternates may include calculations such as energy use estimates or life-cycle cost analysis, and need to demonstrate performance equivalency to or exceeding the basis-of-design. All alternates must be approved by the DFCM Energy Program Director or DFCM hired Energy Engineer.
- (3) Documentation demonstrating compliance with this section must be submitted through the DFCM Energy Program Director for review and acceptance by an appropriate Submittal Reviewer (DFCM hired Energy Engineer, Commissioning Agent, and/or Building Envelop Commissioning Agent)
 - a. Appeals regarding extenuating circumstances related to demonstrating compliance with this section may be submitted to the DFCM Energy Program

Director for consideration. Appeals can only be considered if made prior to the Construction Document design phase.

- (4) Minimum documentation requirements for demonstration of compliance must be based upon the drawings and specifications referenced in the final construction document bid set, including the completion of value engineering, bid alternates, and addenda.
 - a. Submittal will include all relevant project information as described by the Envelope, Mechanical, and Electrical systems sections of this document.
 - b. The Submittal Reviewer shall review and evaluate the submittal. Results of the review, including clarifications and revisions, shall be documented by the Submittal Reviewer with comments. Revisions to the submittal with revised documentation shall be provided in response. A meeting will be held with the Submittal Reviewer, and DFCM Energy Program Director, as necessary, to reconcile any outstanding issues. Final acceptance will be granted by the DFCM Energy Program Director.

A. Appliances & Equipment

- (1) As available, provide appliances, equipment, products, and/or furnishings that meet one of the following criteria³:
 - a. ENERGY STAR Qualified.
 - b. EPACT Registered
 - c. Products that meet or exceed the US Department of Energy's FEMP Energy Efficiency Recommendations
 - d. Rocky Mountain Power incentive, Questar Gas rebate program, or local utility company incentive/rebate approved equipment.

B. Minimum requirements for new construction

- (1) The building envelope requirements in Standard 90.1-2010 Tables 5.5.1-8 or code minimum, whichever is more stringent, are mandatory.
- (2) Minimum efficiency requirements of Standard 90.1-2010 section 6.8 and section 7.8 or code minimum, whichever is more stringent, are mandatory for all new equipment covered under the standard.
- (3) The building envelope requirements of IECC C402.3.1 are mandatory regardless if the project is complying with ASHRAE 90.1 or IECC.
 - (1) During design development the Electrical Engineer will provide a room-by-room count of installed and space-by-space allowed lighting power per Standard 90.1-2010 Table 9.6.1, as well as any lighting power exceptions taken per Standard 90.1-2010 section 9.2.2.3.

5.6 Water Efficiency

- A. Meet the EPA WaterSense⁴ requirements for high efficiency plumbing fixtures and appliances within the building.
 - (1) For plumbing fixtures which, due to other project requirements, are not available with a WaterSense listing, meet the following maximum flows:
 - a. Water closets 1.28gpf
 - b. Showers 1.5gpm
- B. Once-through process water systems are not permitted.
- C. Identify water efficiency goals and system expectations into the OPR and BOD submitted at Design Development and Construction Documents phases.

³ www.epa.gov/ee/products.

⁴ http://www.epa.gov/WaterSense/water_budget/



5.7 Materials and Resources

- A. Provide recycling containers and implement a recycling program in all new buildings.
 - (1) Recycling containers shall be collocated with the garbage bins.
 - (2) If co-mingled recycling is not permitted, bins must be clearly marked.
 - (3) At a minimum, mixed papers, cardboard, mixed plastics, and mixed metals shall be recycled.
- B. Implement a construction waste management plan to divert a minimum of 75% of construction waste, by volume, from the landfill.
 - (1) Provide a narrative for exceptions to compliance with section 5.7.C. Narrative shall define the feasible diversion rate, by volume, and is subject to review and approval by DFCM Energy Program Director.
 - (2) Contractor shall track recycled content, per the HPBS Worksheet, and provide a summary of construction waste at project construction meetings to be reviewed for compliance by the Architect.
- C. Sustainable material sourcing.
 - (1) Identify and specify building materials that are both extracted and manufactured within 500 miles of the project site.
 - a. Only the value associated with the regional content, by percentage, shall contribute to the sustainable value of the product.
 - b. Key materials include concrete, concrete masonry, brick, stone, gypsum board, steel joists, and regionally manufactured misc. metals.
 - (2) Identify and specify building materials that contain recycled materials.
 - a. Recycled content shall be tracked as both pre-consumer and post-consumer recycled content. Only 50% of the value of the pre-consumer recycled content shall contribute toward the sustainable value of the product.
 - b. Only the value associated with the recycled content shall contribute to the sustainable value of the product.
 - c. Key materials containing recycled content include concrete, all metal containing materials, plastic containing materials, carpet, and suspended ceiling systems.
 - (3) 35% of building materials, by value, shall meet one or more of the above sustainable materials strategies.
 - a. Provide the appropriate specification sections and documentation requirements in the construction document set to ensure the contractor understands the sustainable material requirements and expectations.
 - b. Contractor shall track sustainable material sourcing values and product purchase verification, per the HPBS spreadsheet. The Architect shall review summary values for compliance at the project construction meetings.
 - (4) Only use low mercury or LED lamps in new construction projects.

5.8 Indoor Environment Quality

- A. Implement an indoor air quality management plan during construction. This plan shall meet the SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition ANSI/SMACNA 008-2008.
 - (1) The Contractor shall submit an Indoor Air Quality Plan to the CxA, outlining the implementation strategies to achieve the SMACNA requirements.
 - (2) Implementation of this plan shall be tracked on the weekly Construction Meeting Minutes.

- B. Implement a pre-occupancy air quality plan.
 - (1) At the end of construction, prior to occupancy, conduct an air quality test per USGBC LEED v4 Construction Indoor Air Quality Assessment requirements.
 - (2) The Test and Balance sub-contractor shall provide documentation to the Commissioning Agent demonstrating the dates and air flows achieved during the building flush.
- C. All interior paints and coatings shall meet the low emitting materials standards set forth by the South Coast Air Quality Management District Rule 1113, as adopted in January 2012.
- D. All interior adhesives and sealants shall meet the low emitting materials standards set forth by the South Coast Air Quality Management District Rule 1168, as adopted in January 2005.
- E. All flooring systems shall be low emitting, and meet the Green Label Plus program, FloorScore, Greenguard, or the Greenguard low emitting requirements.
- F. All janitor's closets, print and copy rooms, and chemical storage spaces shall be directly exhausted and constructed with a hard ceiling or walls constructed and sealed to deck.
- G. Provide permanently installed entryway systems, regularly maintained walk-off mats, or a combination of the two systems. All entry carpets shall be at least 10' in length at primary entryways.
- H. Office environments shall be designed with task lighting at each individual workstation.
- I. 65% of all regularly occupied spaces shall either have direct access to daylight and views or indirect access through shared glazing systems at interior partitions.
 - (1) Complete the HPBS Sustainability Worksheet to demonstrate compliance with Section 5.8.I.
 - (2) Daylighting and view strategies must be included in the OPR.

5.9 Education and Outreach Program

- A. Develop and implement a Building Education and Outreach Program to inform the building users of the sustainable design strategies. This program shall include the following:
 - (1) Fixed signage describing the sustainable goals and strategies as well as behavior modifications to complement the sustainable design and construction efforts.
- B. The outreach program shall address the following sustainable strategies:
 - (1) Context Sensitive Design
 - (2) Transportation Demand Management Plan and Programs
 - (3) Sustainable Site Design
 - (4) Energy Efficiency
 - (5) Water Efficiency
 - (6) Indoor Environment Quality
 - (7) Recycling and Material Management
- C. Energy Star Tracking
 - (1) The Facilities Operator or Commissioning Authority shall register the building under the Energy Star Portfolio program and input and monitor energy and water consumption of the building.

5.10 Metering

- A. Metering System Scope
 - (1) All state agencies and institutions shall incorporate the utility metering requirements of this section into new construction and major renovation projects. The scope of metering shall include at minimum:

- a. Meters on each utility connected to the building, including but not limited to power, natural gas/propane, domestic water, irrigation water, chilled water, steam or condensate, and heating water, shall be provided as part of the construction project and shall be connected to an energy metering monitor network. If meters provided by utility companies can be connected to this network, these meters can serve to meet this requirement. Otherwise, separate meters will be required as part of the construction project that can connect to the meter monitoring network.
- b. Monitoring network for utility meters shall be connected to each meter and submeter in the building. This network shall connect to the building controls network via a dedicated automation engine device such as a JACE, NAE, or equivalent as approved by DFCM. Communication protocol on the monitoring network shall be BACnet, LON, and/or Modbus RTU and shall be coordinated with the building automation network. All devices connecting to this network shall use the selected communication protocol as their standard means of communication and shall make all data points readily available for monitoring through the network. A schematic of the monitoring network shall be included in the construction drawings.
- c. Meter the entire building electrical load at the main service entrance switchboard. Submetering will not be required for the Durable Housing project.
- d. If individual pieces of equipment have internal metering capabilities that meet the requirements of this section, these points can be mapped into the meter monitoring network in lieu of external submeters.
- e. Where the project is part of a campus of other buildings, coordinate with campus personnel and design standard supplements for additional metering requirements. This may include matching existing head end equipment protocol, particular standards related to specifications of equipment, and requirements for programming on the head-end system to receive the new metering signals.
- f. The meter monitoring network shall be provided with graphics pages available over the web and through the building controls head end system (if provided). The graphics page shall provide a summary of the instantaneous readings of each meter, provide hourly and daily peak kW trend graphics, as well as the monthly and annual peak kW and total kW-hr readings of each meter. Provide data to allow comparisons of each month and year of the building's operation. Trends shall collect data at 15 minute intervals coincident for each meter on the network.
- g. The meter monitoring network shall be provided with export capabilities of a minimum of one year of data at hourly intervals, for all metered points, with trend data required, to either CSV or SQL format.
- h. Construction documents shall include schedules and locations of meters, and require submittals of meters for review by the design team, DFCM, and commissioning agent. Commissioning agent will review installation, calibration, and operation of meter system.

B. Utility Meter Requirements

(1) Electric Power Meters:

- a. Provide digital power meters on all buildings.

- b. Provide power meter output in the communication protocol selected for the meter monitoring network.
 - c. For monitoring the submeters, connect all back to a central location for interface with the Building Automation system node. Provide riser, plans, and details of wiring and conduit connections. Carefully consider how meter wiring can be routed and connected through switchboards. Consider how meters and wiring can be serviced in live switchboards. An acceptable alternate to switchboard mounting is a separate bank of meters adjacent to the switchboard.
 - d. Meters shall meet the ANSI standard for billable type meters. Provide meters to monitor with true RMS metering, with 0.2% accuracy.
 - e. Power meters shall have on board clock with date and time, and be able to record the day and time of any maximum demands or other events.
 - f. Monitor shall include instantaneous demand for kW, kWh, power factor PF, and shall also include maximum demand kW and total kWh.
 - g. Power meters shall have an on board digital display that reports measured voltage, amperage, kW, kWh, and power factor. The digital display shall be programmed and calibrated against a portable meter. Verification and commissioning is required for the monitoring network and the on unit digital display.
- (2) Natural Gas/Propane Meters:
- a. Provide diaphragm type flow meters for sizes up to 1,000,000 Btu/h. Provide rotary type flow meters for sizes above 1,000,000 Btu/h. Accuracy on diaphragm meters shall be +/- 3% over the published flow range of the meter. Accuracy of the rotary meter shall be +/- 2% over the published flow range of the meter. Verify that maximum and minimum flow requirements for the project are suitable for the meter selected. Include requirement in the contract documents to correct meter multiplier for project gas pressure.
 - b. Provide a strainer upstream of all meters. Provide a bypass around meters. If meter is installed outside, route output wiring to local display inside building mechanical room. Orient pipe horizontally where meter is installed. Meter installation shall be in accordance with manufacturer's specifications. Show straight pipe requirements on contract drawings (12 pipe diameters upstream and 7 pipe diameters downstream, unless more is required by manufacturer). Strainers and bypass fittings are not to be included in the straight pipe length.
 - c. If the meter is provided with a dry-contact pulse output, a 4-20 mA output, or a proprietary protocol, require a controller/convertor be provided to convert the signal to the communication protocol used in the meter monitoring network.
 - d. Meter output to the monitoring network shall provide instantaneous flow rate as well as totalized flow rate. A local display shall be provided that shows these flow rates at the meter. Units shall be in CFH for instantaneous flow rate and 100's of cubic feet (CF) for the totalized flow rate.
- (3) Domestic Water Meters:
- a. Provide positive displacement type flow meters for sizes up to 2" and direct coupled turbine type flow meters for sizes up to 20". Insertion turbine type flow meters are acceptable in sizes from 2 1/2" to 8". Accuracy on all meters shall be +/- 2% over the published flow range of the meter. Verify that maximum and minimum flow requirements for the project are suitable for the meter selected.



- b. Provide a strainer upstream of all meters. Provide a bypass around meters that are installed inline. Bypasses are not required for insertion turbine meters that can be removed from the pipeline for maintenance without interrupting flow. Provide a test port downstream of meters.
 - c. Install meter in well-lit and easily accessible area. Orient pipe horizontally where meter is installed. Meter installation shall be in accordance with manufacturer's specifications. Show straight pipe requirements on contract drawings (12 pipe diameters upstream and 7 pipe diameters downstream, unless more is required by manufacturer). Strainers and bypass fittings are not to be included in the straight pipe length.
 - d. If the meter is provided with a dry-contact pulse output, a 4-20 mA output, or a proprietary protocol, require a controller/convertor be provided to convert the signal to the communication protocol used in the meter monitoring network.
 - e. Meter output to the monitoring network shall provide instantaneous flow rate as well as totalized flow rate. A local display shall be provided that shows these flow rates at the meter. Units shall be in GPM for instantaneous flow rate and Gallons, or 10's of Gallons, or 100's of gallons for the totalized flow rate as applicable to the project size.
- (4) Steam Meters:
- a. Provide a vortex type mass flow meter with integral density compensation. Accuracy to be +/-2% over the published range of the meter. Verify that maximum and minimum flow requirements for the project are suitable for the meter selected.
 - b. Provide a strainer and drip leg upstream of all meters. Provide a bypass around meters.
 - c. Install meter in well-lit and easily accessible area. Orient pipe horizontally where meter is installed. Meter installation shall be in accordance with manufacturer's specifications. Show straight pipe requirements on contract drawings (12 pipe diameters upstream and 7 pipe diameters downstream, unless more is required by manufacturer). Strainers and bypass fittings are not to be included in the straight pipe length.
 - d. If the meter is provided with a dry-contact pulse output, a 4-20 mA output, or a proprietary protocol, require a controller/convertor be provided to convert the signal to the communication protocol used in the meter monitoring network.
 - e. Meter output to the monitoring network shall provide instantaneous flow rate as well as totalized flow rate. A local display shall be provided that shows these flow rates at the meter. Units shall be in lb/hr for instantaneous flow rate and 1000's of lb for the totalized flow rate.
- (5) Condensate Meters
- a. Provide positive displacement type flow meters for sizes up to 2" and direct coupled turbine type flow meters for sizes up to 20". All condensate meters shall be rated for operation with fluids up to 230°F. Accuracy on all meters shall be +/- 2% over the published flow range of the meter. Verify that maximum and minimum flow requirements for the project are suitable for the meter selected.

- b. Provide a strainer upstream of all meters. Provide a bypass around meters that are installed inline. Require that meter be installed in a low point in the piping system to ensure the pipe remains full of water. Provide a test port downstream of meters.
 - c. Install meter in well-lit and easily accessible area. Orient pipe horizontally where meter is installed. Meter installation shall be in accordance with manufacturer's specifications. Show straight pipe requirements on contract drawings (12 pipe diameters upstream and 7 pipe diameters downstream, unless more is required by manufacturer). Strainers and bypass fittings are not to be included in the straight pipe length.
 - d. If the meter is provided with a dry-contact pulse output, a 4-20 mA output, or a proprietary protocol, require a controller/convertor be provided to convert the signal to the communication protocol used in the meter monitoring network.
 - e. Meter output to the monitoring network shall provide instantaneous flow rate as well as totalized flow rate. A local display shall be provided that shows these flow rates at the meter. Units shall be in GPM for instantaneous flow rate and Gallons, or 10's of Gallons, or 100's of gallons for the totalized flow rate as applicable to the project size.
- (6) Chilled Water or Heating Water (Below 200°F)
- a. On buildings that receive chilled water or heating water from a remote plant, provide a BTU meter that consists of flow meter, supply and return temperature sensors (matched pair of RTDs), and local display that calculates GPM, Btu/h, and totalizes Btu readings. The flow meter shall be an insertion turbine meter for pipe sizes from 2 ½" to 8". For sizes larger than 8", the flow meter shall be an electromagnetic or ultrasonic flow meter. Accuracy to be +/-2% over the published range of the meter. Verify that maximum and minimum flow requirements for the project are suitable for the meter selected.
 - b. Provide a strainer upstream of all meters. Provide a bypass around meters that are installed inline. Bypasses are not required for insertion turbine meters or ultrasonic flow meters that can be removed from the pipeline for maintenance without interrupting flow. Provide a test port downstream of meters.
 - c. Install meter in well-lit and easily accessible area. Orient pipe horizontally where meter is installed. Meter installation shall be in accordance with manufacturer's specifications. Show straight pipe requirements on contract drawings (12 pipe diameters upstream and 7 pipe diameters downstream, unless more is required by manufacturer). Strainers and bypass fittings are not to be included in the straight pipe length.
 - d. Meter output to the monitoring network shall provide instantaneous flow rate, supply and return temperatures, instantaneous energy transfer rate as well as totalized flow and totalized energy transfer. A local display shall be provided that shows these values at the meter. Units shall be in GPM for instantaneous flow rate, Btu/h for instantaneous energy transfer rate, and 1,000,000's of Btu for the totalized energy transfer. If room temperature will exceed 85°F, move display to adjacent cooler room.

5.11 Data Points

A. Definitions

- (1) The input/outputs points list as defined in Appendix A have the following definitions:
 - a. Digital Input: This term is defined as binary data flow into a controller or control function. These values are "on/off", alarm or normal, 0 or 1, etc.
 - b. Digital Output: This term is defined as binary data flow out of a controller or control function. These values are on/off, start/stop, open/close, etc. These values are typically shown as 0 or 1, True or False, On and Off, etc.
 - c. Analog Input: This term is defined as analog data flow into a controller or control function. These values are associated with thermostats, thermo wells, transducers, CO₂ sensors, humidity sensors, flow sensors etc. These values are typically shown in incremental values.
 - d. Analog Output: This term is defined as analog data flow out of a controller or control function. These values are associated with speed, position, damper actuators, valve actuators, etc. These values are typically shown as 0-100%.
 - e. Hardwire Interlock: This term refers to physical wiring between two devices which prevents one device from operating until the other device confirms ability to operate. These types of interlock are typically associated with a damper confirming open before a fan may start, a valve confirming open until a pump may start, etc. This does not refer to any software interlock but an actual physical connection.
 - f. BAS Communication: This term refers to values sent from or sent to devices which communicate over a software communication protocol such as LonWorks, BACnet, Modbus, or other software communications. These are not physical points directly wired to controllers but are typically sent over a communications protocol.
- (2) The graphics points list as defined in Appendix A have the following definitions:
 - a. Dynamic Flow Diagrams: This refers to graphics which have animation showing digital inputs operation. These are animations are typically fan status as shown as a moving fan, pump status as shown as a moving impeller on a pump graphic, a coil status as shown as a color change in the coil color, etc.
 - b. Start/Stop: This refers to a digital output value as shown in textual format. These values show open/close, start/stop, as physically shown on the graphic
 - c. Display Status: This refers to a digital input value as shown in textual format. These values show on/off, open close, as physically shown on the graphic.
 - d. Display Value: This refers to both analog inputs and outputs as shown in textual format. These values show percentage open, speed, gpm, cfm, etc.
 - e. Adjust Value: This refers to any value that can be manipulated through the BMS system. These values can be adjusted as an override from the BMS or an adjusted setpoint. All controlling setpoints will be shown on the graphic.
- (3) The other points list as defined in Appendix A have the following definitions:
 - a. Alarm Local: This refers to an alarm that is shown only locally on the BMS and an alarm that does not require immediate attention by staff or an alarm that is generally not detrimental to the system if it does not function correctly. Different priorities will be defined in the project requirements.

- b. Alarm Email: This alarm is reserved for failures in the system which could create a great monetary expenditure to resolve if not addressed immediately. The intent is to alarm offsite personnel during unstaffed time periods to immediately come to the site to resolve the issue before further damage could be done.
- c. Trend 15 Minutes: This refers to trending that needs to be setup in the system to trend every 15 minutes. The cache for these trends needs to be at least 8 weeks in storage for review by the DFCM or user groups. Trend charts shall be setup by the contractor in direction of the Cx, Engineer, or User group. It is not the intent that all points listed in the "trend 15 min" be all shown on a single chart but be separated in relation to the control of the system and the command of the system. An example is an pumping system where the lead/lag or duty/standby is shown compared to the differential pressure in the system.

B. Implementation

- (1) The points list shall only be implemented in buildings that require a BMS. If a BMS system is not required or requested by DFCM then the points list will not apply in its entirety.
 - a. This requirement is not to alleviate Design/Build applications from providing a BMS unless it is specifically stated in the program documents that it is not required.
 - b. If the program documents do not addressed a BMS then it will be inferred that a BMS is required in compliance with this section.
- (2) Trending will be implemented for all pieces of equipment as defined in the points list. Individual charts shall be created at direction of the Cx, Engineer, or DFCM representative. These trend charts shall be able to be access through a web interface and a single point click. The intent is not to have these charts created each time an individual logs into the system. The intent is to have these charts access through a single click.
- (3) Implementation of this section is not to be applied wholly to each individual building. The intent is only individual systems as applied to the project only be followed per the stated section.
- (4) Any system that is not listed in the points list shall not alleviate the design or construction team from implementing a defined points list. In the event that a system is not defined a list shall be provided to DFCM to show which points shall be implemented. The points list shall be delivered to the DFCM, user groups, and Cx by the design team before 50% CDs are created in a Design-Bid-Build or CM/GC delivery system. The points list shall be delivered to the DFCM, user groups, and Cx by the design team before DDs are created in a Design/Build delivery system.
- (5) A narrative shall be submitted to DFCM in the event compliance with section 5.11 is too stringent or costly for a given project that requires a BMS. Any waiver shall be approved by the DFCM and the user group. The waiver shall be accompanied by a descriptive reason on why the standards are too stringent or costly for the project.
 - a. The waiver shall not be approved when finances are not in place, only when the implementation does not prove to have a reasonable use.

5.12 Commissioning

- A. The following industry standards provide a minimum level commissioning in to determine the scope for capital development projects.
 - (1) American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) – ASHRAE Standard 202, Commissioning Process for Building and Systems



- (2) National Environmental Balancing Bureau (NEBB) - Procedural Standards for Whole Building Systems Technical Commissioning
- (3) Building Commissioning Association (BCxA) - New Construction Building Commissioning Best Practice
- (4) AABC Commissioning Group Guidelines (ACG) – ACG Commissioning Guideline
- B. DFCM shall determine the systems and assemblies to be commissioned, per the OPR, in the project's team's scope. The following systems must be commissioned as a minimum.
 - (1) HVAC:
 - a. Primary ventilation equipment
 - b. Exhaust equipment
 - c. Heating and cooling systems
 - (2) Electrical:
 - a. High voltage switchgear
 - b. Building transformer
 - c. Generator
 - (3) Controls:
 - a. Lighting controls
 - b. HVAC controls
 - (4) Life Safety:
 - a. VESDA system
 - b. Smoke and fire damper inspection
 - (5) Security:
 - a. Closed circuit television system
 - b. Access control system
 - (6) Plumbing:
 - a. Domestic hot water system
 - (7) Telecom:
 - a. Connection to central campus system (fiber)
 - b. Dedicated cooling systems
- C. The following duties only pertain to mandatory systems to be commissioned. Other systems that may be commissioned shall be defined per individual project. The following duties shall be performed by the commissioning project manager and not any other individual commissioning team member:
 - (1) Review OPR at each design phase
 - (2) Review BOD at each design phase
 - (3) Review each design phase (Programming, SD, DD, CD) submittal for compliance to HPBS Sections
 - (4) Attend Design Meetings as necessary, including design phase review meetings, systems meetings and HPBS Workshops
 - (5) Conduct Commissioning Kick-off Meeting, attendees per Section 5.1
 - (6) Review the Commissioning Plan (prepared by other commissioning team members)
 - (7) Review submittals for main pieces of equipment and issue a report written by the project manager (main pieces of equipment include Steam Heat Exchangers, Chillers, Cooling Towers, Heat Pumps, Air Handling Units (larger than 5,00 CFM), Pumps, VFDs, Lighting Controls, Building Management System, Roof Top Units, VRF, Chilled Beams, VAV, FCU)
 - (8) Attend Construction Meetings (at least monthly at first install of MEP rough in)
 - (9) Review first installed or mock-up items

- (10) Review Final Sequence of Operations as installed to ensure compliance with documentation.
- (11) Review Functional Acceptance Test final test records (as performed by other commissioning team members)
- (12) Review Test and Balance Report
- (13) Review Commissioning Report
- (14) Review Systems Manual
- (15) Review Trending data (at least four weeks) for major pieces of equipment and lighting controls
- (16) Follow up on the project at 3, 6, 9, 11 months to ensure the system is performing as intended.
- D. The following duties shall be performed by the commissioning agent or may be performed by the commissioning project manager and not any other individual commissioning team member:
 - (1) Review SD drawings
 - (2) Prepare the commissioning plan
 - (3) Review minor submittals (minor submittals include piping, valves, plumbing equipment, other electrical equipment not defined in project managers duties, and other pieces of equipment not defined in the project manager duties)
 - (4) Conduct construction meetings
 - (5) Verify Equipment on site matches items submitted
 - (6) Prepare and execute PFAT checklist
 - (7) Prepare and execute FAT checklist
 - (8) Verify proper operation and calibration of all (100%) points on PT-PT checks on the building management system, occupancy sensors, and day lighting controls.
 - (9) Attend Startup of major (as defined in section E.7 above) pieces of equipment and review startup reports from contractors.
 - (10) Review issues logs.
 - (11) Review Training Agendas
 - (12) Prepare the Commissioning Report
 - (13) Prepare the Systems Manual
- E. The following duties shall be performed by the commissioning technicians or may be performed by the commissioning agents or may be performed by the commissioning project manager and not any other individual commissioning team member:
 - (1) Review all installed pieces of equipment, piping, insulation, conductors, receptacles, switches, transformers, switchgear, panel boards, switchboards, MCC, VAV, VRF, Chilled beams, FCU, Exhaust Fans, Relief Fans, etc. that they meet OPR, CD, and Manufacturer recommended instructions
 - (2) Assist in execution of PFAT checklist
 - (3) Assist in execution of FAT checklist
 - (4) Perform all other duties not defined in the commissioning project manager and commissioning agents responsibilities but defined in the Standards and Guidelines as defined in the Standards and Guidelines section.
 - (5) Prepare and maintain issues logs.

5.13 Envelope Commissioning

- A. High performance buildings shall be commissioned in general compliance with ASTM E2813-12 *Standard Practice for Building Envelope Commissioning*. Where conflicts arise between ASTM E2813 and this Standard, this Standard shall supersede. The BECxA (Building Envelope Commissioning Authority) will be contracted and report directly to the DFCM.
- B. Building Components Included in Building Envelope Commissioning
 - (1) Below-grade construction including foundations, basements, and slab-on-grade that functions as part of the exterior enclosure system with utilization of waterproofing and drainage systems, but excluding structural and fireproofing systems and components
 - (2) Superstructure floor and roof construction that functions as part of the exterior enclosure system.
 - (3) Exterior enclosure construction, above grade, including exterior opaque walls and claddings, fenestration, sheathing, framing, insulation, air barriers, vapor barriers, drainage control layers (or Water Resistive Barriers –WRB's), RF shielding materials, and additional components of the assembly that may impact the long term performance of the enclosure.
 - (4) Roofing, including roofing system, roofing insulation, air barriers, vapor barriers, roofing membranes, skylights, hatches, and other roof openings/penetrations.
- C. Building Envelope Commissioning – Phases and Tasks – Design-Build
- D. The overall BECx process and scope of services shall be in general accordance with the following industry standards, but with emphasis placed on ASTM E2813:
 - (1) NIBS Guideline 3-2012 Building Envelope Commissioning Process
 - (2) ASTM E2813 Standard Practice for Building Envelope Commissioning
 - (3) CSA Z320-11 – Building Commissioning Standard & Check Sheets
- E. The following tasks shall be included in the BECx scope of work
 - (1) Pre-Design Phase
 - a. The Building envelope commissioning agent (BECxA) must be engaged during or prior to the pre-design phase for all projects.
 - b. The OPR, relative to the building envelope components selected for commissioning, is documented in order to establish a baseline of performance expectations to which the actual installed performance is compared. The BECxA, with the assistance of the Owner, discusses the BOD Summary that documents the OPR for those building systems selected for commissioning. The BOD Summary reflects the underlying assumptions and requirements that become represented in the construction documents. The OPR is developed by the Owner and documented by the BECxA. Project schedule, design life, and project delivery method should all be included in the OPR.
 - c. Review of the design narratives to attain an understanding of the BOD. The Basis of Design (BOD) Document records the concepts, calculations, decisions, and product selections used in the design to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document generally includes both narrative descriptions and lists of individual items that support the design process. The BOD Document is developed by the Architect/Engineer of Record (A/E) through a series of design narratives. The BECxA reviews the BOD statement and design narrative documentation and provides written commentary to the A/E and other members of the Commissioning Team as required.
 - d. Identify the scope of the BECx process. A BECx Scope Meeting will be conducted. Topics to be covered during the BECx Scope meeting include, but are not limited to, the BECx process, communication protocols, and development of OPR and BOD. The step is often accomplished with a conference call.
 - e. Development of the initial BECx plan. The BECxA will develop the initial BECx plan, which can either be its own entity (common) or a part of the Master Commissioning Plan (uncommon). The plan shall include key elements including, but not limited to, project schedule inclusive of BECx tasks and milestones,

systems to be commissioned, roles and responsibilities of commissioning team members, means of communication and reporting of conditions and progress throughout the BECx process, and the level of documentation expected throughout the BECx process. The plan is updated periodically throughout the BECx process to reflect changing project conditions or requirements until the end of the project, when it then becomes the Project Commissioning Record.

- (2) Design Phase
 - a. The BECxA shall review the relevant project documents to assist with the development of a building envelope that provides environmental separation. The design concepts will be evaluated against the OPR and BOD. The review will include verification that all systems to be commissioned are addressed in the BOD and fulfill the OPR such that the systems are coordinated with each other. The review shall occur a minimum of two times, including a back-check of subsequent issuances. Deliverables typically consist of written mark-ups of the architectural drawings and project specifications to be shared and discussed with the project team. The Design-Build team provides a written response to the BECA and Owner as to how the comments will be reflected in the final bid documents. On a typical high performance project, there will be at least three in person meetings between the Design-Build team and the BECxA
 - b. The BECx requirements are incorporated into the construction documents via a BECx specification sections provided by the BECxA and submitted to the A/E for review and approval. The functional performance testing requirements (including both mock-up and field testing) will be incorporated into the construction documents via a functional performance testing specification section. Both specification sections are created by the BECxA based on the requirements outlined in the OPR and BOD and submitted to the Design-Build team for review and approval.
- (3) Pre-Construction Phase
 - a. The Design-Build team or Contractor shall provide all sub-contractor submittals, including material submittals, shop drawings, applicable substitution requests, and quality control documentation to the BECxA prior to commencement of building envelope construction. The BECxA will review all contractor exterior envelope submittals for compliance to the BOD, design documents, performance, and constructability, with concentration on transition details, sequencing concerns, and quality control contractual requirements. All concerns shall be forwarded, in writing, to the A/E for their review and formal response to the Contractor. All submittal and shop drawing reviews by the BECxA will occur prior to review by the Design-Build team, when possible. When applicable, the BECxA will provide written mark-ups of the shop drawings to the Design-Build team. Air barrier shop drawings are required on all projects.
 - b. In general, the Contractor will complete construction checklists for all assemblies and systems prior to formal performance testing of equipment or subsystems of the given system. These checklists will be reviewed by and as needed commented on by the BECxA
 - c. The Contractor will arrange and schedule a Pre-Construction Trade Orientation Meeting, prior to the commencement of the building envelope mock-up or building envelope construction, to be chaired by the BECxA. Topics covered during the meeting would include, but not necessarily be limited to, inspection and testing procedures, review of plans and specifications, review of shop drawings, construction schedule and sequencing, material selection and compatibility, and other installation concerns. This meeting may also serve as the building envelope commissioning kick-off meeting or they may be separate meetings.
 - d. In-situ mock-up(s) of the critical envelope components shall be constructed and tested prior to proceeding with commencement of building envelope construction



in order to verify the performance of the systems and to set construction standards and material selection for the duration of the project. Components required in the mock-ups will be as identified in the relevant sections of the Project Specifications and Architectural Drawings. Construction of the mock-up is to be observed and documented by the BECx. Once completed, the Contractor will provide confirmation of completion to the BECx and the Design-Build team. The completed mock-up will then be reviewed by the BECx and A/E for compliance to the Contract Documents. Once the mock-up has been visually observed for compliance to the Contract Documents, the mock-up will be tested to ensure adherence to the performance requirements set forth in the Contract Documents. The testing protocol will be as identified in the Contract Documents in the Functional Performance Test Specification developed by the BECx during the Design Phase. Should failures occur during mock-up testing, the Contractor shall investigate the source of the failure and propose a remediation strategy for review and comment by the BECx and Design-Build team, and install the approved repair work. The mock-up shall be retested until passing results are achieved, prior to proceeding with similar work elsewhere on the project site. Any repairs or remedial work performed on the mock-up must be documented by the BECx.

(4) Construction Phase

- a. The BECx will participate in pertinent envelope performance/installation meetings and commissioning meetings as required.
- b. The BECx will participate, in person or via conference call, at least one OAC meeting per month.
- c. Upon commencement of building envelope construction and continuing throughout the construction process, on-site inspections will be conducted by the BECx to review the Work for compliance to Contract Documents and industry standards. Deficiency logs will be generated by the BECx and repairs tracked with the goal of having a zero punch list project.
- d. The BECx will observe or perform functional performance testing of the building envelope. The field testing protocol will be as identified in the Contract Documents in the Functional Performance Test Specification developed by the BECx and included in the project specifications. Failed tests should be retested until satisfactory results are achieved. Additional testing may be performed as determined by the Owner and the BECx as outlined in the functional performance test specification. Envelope components and systems shall not be installed on the building or beyond the in situ mock location until testing has demonstrated satisfactory results.
- e. The BECx plan will be updated as needed, as this is a living document and may reflect new and/or reduced requirements as directed by the Owner.
- f. The BECx may participate in dispute resolution regarding exterior envelope components/systems and associated performance. The BECx and the Design-Build team may be relied upon during construction to evaluate compliance with the OPR; to provide and vet out alternative solutions; and to evaluate the associated risks.

(5) Post-Occupancy Phase

- a. The BECx will finalize the BECx plan and the final commissioning report with respect to the building envelope.
- b. The BECx provides appropriate training to the building maintenance personnel with respect to building envelope maintenance.
- c. The BECx will provide a site review and follow-up meeting 10 months post-occupancy. A written post-occupancy site visit report will be incorporated into the Building Envelope Commissioning Record.

F. Guidelines for performance criteria and associated functional performance testing commissioned systems/assemblies are as follows below. The BECx may deviate from the general recommendations below to suit project needs. Section 5.16 lists Referenced Standards and Codes which can be applied to the building envelope functional performance testing plan.

(1) Water

- a. In general, water testing on a façade surface shall be in accordance with ASTM E 1105 or AAMA 501.1. Project test pressures will be based on the wind load calculations per ASCE 7 in conjunction with the rated performance of specified products per AAMA 101 with a minimum 6.24 psf differential pressure. Water leakage shall be defined as any water that is interior to the primary plane of air tightness (whether visible or not from the interior) that is not positively drained to the exterior. Detailed water penetration resistance requirements are outlined in Appendix G.

(2) Vapor

- a. A Class I or Class 2 continuous vapor barrier (or vapor retarder) must be provided to all exterior opaque walls, roofing, below grade foundation walls and slabs, and slab-on-grade conditions as determined by appropriate hydrothermal analysis. Mechanically fastened barriers are not acceptable. This vapor barrier shall be sealed at all interfaces, fenestrations, penetrations, exterior light fixtures, etc. A vapor barrier (or vapor retarder) is defined as materials with vapor permeability below 1.0 perm per ASTM E96 desiccant or dry cup method (Class I or Class II per 2012 IBC).
 - i. Testing is not required, but visual inspections of installed work are required. High Performance structures require vapor barriers to be included in the performance mock-up.

(3) Air

- a. In general, air testing is performed in accordance with ASTM E 1186-03 (2009), per section 4.2.6 Chamber Pressurization or Depressurization in Conjunction With Smoke Tracers. This testing program should include representative specimen of each typical interface between systems (claddings, fenestrations, roofing, etc.) that exists on High Performance structures with a minimum of one specimen, which represents the most common fenestration and cladding type. ASTM E 783-02 (2010). Field measurement of air leakage through facade surfaces, including fenestration and opaque walls, is required to be in general compliance with ASTM E783-02(2010). Test chamber shall be constructed air tight and sealed to the air barrier plane of air tightness when practicable. Test specimen shall include minimum of 75 square feet of opaque wall and an interface with a representative fenestration assembly. Test chamber typically encompasses entire punched opening and out of sequence installations may be necessary to accommodate testing. All penetrations shall be installed through the air barrier (masonry ties, girts/cladding supports, etc.).

- (4) Whole Building Air Testing may be performed on this project (as determined by DFCM) in accordance with USACE (United States Army Corp of Engineers) air leakage standard rate of .25 cfm/sf envelope area. The Design-Build team is to provide the BECx consultant an area calculation of the building area 2 weeks prior to testing date. Contractor to provide access to all areas of the building. Contractor to coordinate with the mechanical contractor to a) be present during the test b) shut off all mechanical equipment c) mask off (prevent air leakage) through mechanical equipment d) assist in determining air leakage during testing activities (should this occur) and e) return mechanical equipment to normal operating condition at the conclusion of the test.

(5) Masonry through-wall flashing should be tested to confirm watertight construction in general conformance with ASTM C1715-09 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems. At selected specimen locations, after three (3) courses of masonry has been installed above the level of the flashing, apply water on top of the flashing at each lap joint and end dam. Mortar Joints shall be "concave", "V-joint" or "weathered raked" for structural members and surfaces exposed to weather. When CMU forms the substrate for an air barrier or coating, mortar joints shall be struck flush. The exposed face of all embed plates shall be set flush with the face of masonry wall or column.

(6) Stainless steel anchor ties should be used for all buildings with a services life in excess of 50 years. All anchors should be installed prior to installation of the exterior air barrier, such that the penetration of the air barrier can be evaluated prior to concealment. Anchors applied after the air barrier shall include sealant applied to the threads prior to installation and sealant applied over the fastener head, under the fastener head, under the anchor, and additionally detailed per the air barrier manufacturer recommendations. Fastening anchors through insulation and then through the air barrier blindly is not permitted on High Performance Structures. For all High Performance structures, the performance expectations of the veneer ties should meet or exceed the life expectancy of the building.

(7) Insulation: All buildings with exterior insulation within a masonry cavity shall utilize mechanical attachment in conjunction with the lateral masonry anchors, such as insulation washers, as a secondary means of secured attachment for the exterior insulation. Insulation attachment shall be installed in a manner to prevent the attachment from becoming dislodged due to the long term expansion and contraction of the insulation material.

(8) Glazing systems: Glass areas shall be reasonably minimized to conserve energy during winter and summer. Glazing area in excess of prescriptive table allowances of IECC or ASHRAE 90.1 shall be reviewed by the BECxA and approved by DFCM. Higher SHGC or U-Factor (lower R-Values) than those required in the IECC and ASHRAE 90.1 prescriptive tables shall not be permitted without review by the BECxA and DFCM and approval by DFCM. Aluminum thermally broken frames and sashes are to be used in all windows. Wood or steel is not acceptable. Standard Performance structures shall utilize windows with a minimum performance rating of CW40 per AAMA 101-2011 North American Fenestration Standard/Specification for Windows, Doors, and Skylight; High Performance structures shall utilize a minimum performance rating of AW40. Design Build team to demonstrate Glazing system(s) continuity to air/vapor barrier at all head, jambs and sill locations.

(9) Below grade waterproofing: The system must be designed as follows:

- Relieve hydrostatic pressure on substructure walls and allow water drainage to the level of the drain.
- Membrane waterproofing must be fully bonded to the substrate and seamless.
- Below-grade waterproofing must be applied to the positive pressure side and must be covered by a protection drainage and protection course.
 - a. In the presence of water table, completely encapsulate the structure in waterproofing and drainage medium to minimize hydrostatic head.

5.14 Incentives and Rebates

- A. Utility sponsored incentive and rebate programs when properly leveraged offer project additional cause to implement energy efficient strategies into the State's facilities. It is the intent of DFCM to obtain, in a timely manner, all possible gas and electric utility incentives and rebates for the *prescriptive or typical* measures included in their new building projects.

- (1) *Prescriptive* energy efficiency measures are defined as those that propose equipment/systems that exceed existing building energy code and have incentives or rebates paid based on the type, size, and quantities of high efficiency equipment installed.
- B. This section of the HPBS and its supporting appendices provide information about the incentive and rebate process as well as guidance to project teams on how to best navigate both Rocky Mountain Power (RMP) and Questar Gas Company's (QG) programs.
 - (1) As of July 1st, 2014 only RMP and QG are the only utility providers in Utah who offer whole building program incentives and rebates. Therefore this section is oriented towards the programs that they currently offer. If, at a later time, local municipal utility companies offer incentive and rebate programs, the DFCM will utilize those programs, when possible, to further energy efficiency in State's facilities.
- C. Incentive and rebate opportunities shall be properly identified in the design phase of each project.
- D. Possible incentive and rebate values for specific energy efficiency strategies shall be incorporated as a separate line item in the LCCA required in section 5.5.
- E. In the case where the incentive and rebate program conflicts with the sections within the HPBS that conflict shall be made know to the DFCM Energy Program Director, who will then discuss the conflict with the project team.
- F. The architect is ultimately responsible for the design team performing their assigned tasks and obtaining all utility incentives and rebates.
- G. Custom energy efficiency measures (EEMs), are to be identified and handled by the design team by reporting them, as soon as they are identified, to the DFCM Energy Program Director who will coordinate with the proper utility.
- H. Appendix H and Appendix I provide a road map for how the project's prescriptive measure incentives are to be obtained. Deviations from the process outlined in this appendix must be approved by DFCM's Energy Program Director.

5.15 Owner's Project Requirements

- A. A concise OPR must be developed by the design team and owner during the project programming phase.
 - (1) For projects with a programming phase, the OPR is required to be complete and included in the project program.
- B. Once the initial OPR and BOD are developed by the design team and the Commissioning Agent (CxA) has been integrated into the project, it is to be reviewed by the CxA at the SD, DD and CD submittal.
- C. Changes to the OPR and BOD, from one design phase to the next, must be documented by the design team.
- D. Coordination of the OPR with DFCM's Design Requirements⁵ is required.

5.16 Referenced Standards

American Architectural Manufacturers Association

- a. AAMA 101-2011 North American Fenestration Standard/Specification for Windows, Doors, and Skylights
- b. AAMA 511-08 Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products

⁵ http://dfcm.utah.gov/downloads/design_manual/design_requirements.pdf



- c. AAMA 501.1-05 Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure

American Society of Civil Engineers

- a. ASCE 7 Minimum Design Loads for Buildings and Other Structures

American Society of Heating, Refrigerating and Air-Conditioning Engineers

- a. ASHRAE Standard 90.1-2010 -- Energy Standard for Buildings Except Low-Rise Residential Buildings

ASTM International

- a. ASTM C90-14 Standard Specification for Loadbearing Concrete Masonry Units
- b. ASTM C91/C91M-12 Standard Specification for Masonry Cement
- c. ASTM C144-11 Standard Specification for Aggregate for Masonry Mortar
- d. ASTM C150/C150M-12 Standard Specification for Portland Cement
- e. ASTM C207-06(2011) Standard Specification for Hydrated Lime for Masonry Purposes
- f. ASTM C270-12a Standard Specification for Mortar for Unit Masonry
- g. ASTM C370-12 Standard Test Method for Moisture Expansion of Fired Whiteware Products
- h. ASTM C595/C595M-13 Standard Specification for Blended Hydraulic Cements
- i. ASTM C794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
- j. ASTM C1060 Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
- k. ASTM C1153 Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging
- l. ASTM C1157/C1157M-11 Standard Performance Specification for Hydraulic Cement
- m. ASTM C1193 Guide for Use of Joint Sealants
- n. ASTM C1258 Test Method for Elevated Temperature and Humidity Resistance of Vapor Retarders for Insulation
- o. ASTM C1329/C1329M-12 Standard Specification for Mortar Cement
- p. ASTM C1384-12a Standard Specification for Admixtures for Masonry Mortars
- q. ASTM C1400-11 Standard Guide for Reduction of Efflorescence Potential in New Masonry Walls
- r. ASTM C1498-04a(2010)e1 Standard Test Method for Hygroscopic Sorption Isotherms of Building Materials
- s. ASTM C1715 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage System
- t. ASTM D5957-98(2013) Standard Guide for Flood Testing Horizontal Waterproofing Installations
- u. ASTM E783-02(2010) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
- v. ASTM E1105-00(2008) Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
- w. ASTM E1186-03(2009) Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems

- x. ASTM E2357-11 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- y. ASTM E2112-07 Standard Practice for Installation of Exterior Windows, Doors and Skylights
- z. ASTM E2178-13 Standard Test Method for Air Permeance of Building Materials
- aa. ASTM E779-10 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- bb. ASTM E2813 Standard Practice for Building Enclosure Commissioning

Canadian Standards Association

- a. CSA Z320-11 – Building Commissioning Standard & Check Sheets

Institute of Transportation Engineers

- a. 4th Edition Parking Generation Guide

International Code Council

- a. AC308-2013 Acceptance Criteria for Water-Resistive Barriers
- b. 2012 International Building Code
- c. 2012 International Energy Conservation Code

National Institute of Building Sciences

- a. NIBS Guideline 3-2012 Building Enclosure Commissioning Process

5.17 Definitions

Baseline – The performance level used for comparison to the above standard design.

Basis of Design – Formal documentation of the primary decision-making process and assumptions behind design decisions made to meet the OPR.

Building Analytics – Software programs that utilize data provided by building management systems (BMS) to deliver automated fault detection, diagnosis and real-time performance monitoring. Applications include building commissioning, equipment fault detection, energy analysis, load profiling, facility benchmarking, asset performance tracking, and carbon and greenhouse gas reporting.

Building Commissioning - A systematic and documented process of ensuring that the owner's operational needs and performance requirements are met. Additionally the process ensures that building systems perform efficiently and building operators are properly trained. Then intent of the process is to set the stage for facility operators to operate the building as intended in the building design. A Commissioning Agent (Cx) is generally responsible for implementing the building commissioning process.

Building Envelop Commissioning - Building Envelop Commissioning (BECx) is a process involving evaluation, verification, and documentation that a building's design and construction meet defined performance expectations. BECx begins at the project inception and continues through the start of the Operations and Maintenance Phase. A Building Envelop Commissioning Agent (BECxA) is generally responsible for implementing the building commissioning process.

Cost Estimator – Consultant responsible for providing a forecast of construction cost prepared on the basis of a detailed analysis of materials and labor for all items of work. Note that this is different from preliminary estimates of construction costs based on area, volume or other conceptual estimating techniques often provided by the owner or architect.

Design Build – Design build is defined as the selection of the qualified design build entity through a competitive process which may require evaluation of the concept design and project cost, along with other criteria. The procurement of architect-engineer services and construction services by the use of a single contract with the design build provider.

Design Team – Consultants providing design services to the project, including but not limited to, Architects, Mechanical Engineers, Electrical Engineers, Civil Engineers, Landscape Architects, Acoustical Engineers, Kitchen Designers.

Direct/Site Emissions - Emissions from fuel that is directly burned at the building for heating, electricity generation or other facility operations.

General Contractor – Contractor providing construction management, cost estimating and general contracting services, including and not limited to supporting subcontractors.

High Performance Building Standard (HPBS) – The requirements and process outlined within DFCM's Design Requirements, section 5.0, that require State buildings to be designed and built in such a manner to optimize energy efficiency, durability, life-cycle performance, water efficiency, material resources, occupant comfort and productivity.

High Performance Building Standard Workshop – Formal collaboration and coordination meetings in which various goals and strategies related to the HPBS are identified and evaluated in the context of the project. See Appendix? –HPBS Workshop Suggested Agenda.

Indirect/Source Emissions - Emissions associated with energy purchased from a utility, such as emissions generated from the generation of electricity at a coal fueled power plant.

Life Cycle Cost Analysis - Life-cycle cost analysis (LCCA) is a method for assessing the total cost of facility ownership. It takes into account all costs of acquiring, owning, and disposing of a building or building system. LCCA is useful when project alternatives that fulfill the same functional requirements, but differ with respect to initial costs, operating costs and performance, have to be compared in order to select the one that maximizes net savings.

Owner – One or more of the following, DFCM Project Manager, Facility Operator, Facility Manager, DFCM Energy Program Director, Agency Energy Manager, DFCM, State Institution, State Agency, or other governmental entity that DFCM is providing project management services for.

Owner's Project Requirements (OPR) – A formal document created in the programming phase that provides a basis for the project's functional and performance requirements. This document is intended to provide an explanation of ideas, concepts and requirements that are important to the

owner. It is to be initially completed by the Architect with input from the owner and other parties as necessary. See Section 5.15 – Owner's Project Requirements

State Agency - Any state agency, board, commission, department, or division

State Institution –Institutions referring to the University of Utah, Utah State University, Southern Utah University, Weber State University, Snow College, Dixie State University, College of Eastern Utah, Utah Valley University, Salt Lake Community College, Utah College of Applied Technology, and any other university or college which may be established and maintained by the state

5.18 Appendices (electronic files from DFCM will be available to the design team)

- A. Data Points List – Section 5.11 (not applicable/not included)
- B. Energy Modeling Spreadsheet – Section 5.5 (not applicable/not included)
- C. Life Cycle Cost Worksheet – Section 5.5 (not applicable/not included)
- D. **HPBS Sustainability Worksheet – Section 5.2, 5.3, 5.4, 5.6, 5.7, 5.8**
- E. HPBS Workshop Suggested Agenda – Section 5.1 (not applicable/not included)
- F. OPR Required Sections – Section 5.15 (not applicable/not included)
- G. Envelope Commissioning Matrix – Section 5.13 (not applicable/not included)
- H. **Incentives and Rebates Process Guidelines – Section 5.14**
- I. **Incentives and Rebates Responsibility Matrix – Section 5.14**



Site Design per Section 5.2

Please list all local or regional planning documents that were reviewed and considered during the preliminary design of the project. Provide a narrative to describe how the project has been designed to reflect the vision established in the document, as applicable.

Document	Oversight Entity	Applicability to Project
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Building Design

Provide a narrative describing the building massing, siting, orientation and facade design strategies employed to reduce the environmental impact of the building. Describe access needs of the project including pedestrian and vehicular including their related design strategies.

Access

Describe access needs of the project including pedestrian and vehicular including their related design strategies.

Transportation Management per Section 5.3

Describe the transportation management goals for the project. Identify specific design strategies to reduce the impacts of single-occupant vehicle trips.

Site Design per Section 5.4**Landscape Water Consumption**

Please provide the project water budget, based on the EPA Water Budget Tool

Landscape Water Budget*

gallons / year

Design Water Usage*

gallons / year

% Reduction over Baseline

#DIV/0!

Description of Area	Square Feet	Percent of Total
Total Parcel Area or Area within Limit of Work	3,000.0	100.0%
Building Footprint(s)	1,000.0	33.3%
Hardscape Areas - All paved pedestrian and vehicular paths including sidewalks, parking areas, emergency access, courtyards, paths etc.	1,000.0	33.3%
Landscape Areas - All softscape and vegetation areas including turf, planting beds, roof gardens, mulched areas, and natural open space etc.	1,000.0	33.3%
Hardscape Area		
Description of Area	Square Feet	Percent of Total
Total Hardscape Area (Pedestrian/Vehicular)	1,000.0	100.0%
Usable Pedestrian Hardscape - Sidewalks, Pedestrian Paths, Hardscape Patios, etc.	200.0	20.0%
Usable Vehicular Hardscape - Vehicular Traffic Areas, Parking and Emergency access Areas	800.0	80.0%
Landscape Areas		
Description of Area	Square Feet	Percent of Total
Total Landscape Area (Softscape/Vegetation)	1,000.0	100.0%
Usable Turf Areas (200 square foot area minimum for each turf area)	300.0	30.0%
Usable, Aesthetic, Groomed Planted Areas	300.0	30.0%
Native or Natural Open-Space (Maximize area)	400.0	40.0%

* Per the EPA Water Sense Water Budget http://www.epa.gov/WaterSense/water_budget/

* Attach a copy of the EPA Water Sense Budget Analysis

Site Design per Section 5.4**Storm Water Design**

Describe the Best Management Practices listed in the Salt Lake County Engineering and Flood Control Guidance

Practice**Design Implementation****Heat Island Effect**

Total number of parking stalls	1 sf
Number of compact vehicle stalls	1 sf
Percentage of compact stalls	100%
Concrete Area	1 sf
Solar Reflective Index of Concrete	Must be >29
Asphalt Area	1 sf
Percentage of hardscape with high SRI paving	100%

Please describe any additional strategies employed to reduce the urban heat island effect.



Water Efficiency per Section 5.6

Please describe measures taken to reduce water consumption in the building mechanical and process water systems

Worksheet: Project Cost Breakdown by Category Period: 01/01/2023 to 12/31/2023						
Category	Material	Equipment	Subcontractor	Material	Subcontractor	Material Cost
Excavation						
Foundation						
Structure						
Roofing						
Interior Finishes						
Exterior Finishes						
Landscaping						
Utilities						
Other						
Total						
Subtotal: Material Cost						
Total: Material Cost						
Total: Subcontractor Cost						
Total: Project Cost						
Total: Project Cost (including taxes and fees)						

Indoor Environment Quality per Section 5.8**Pre-Occupancy Air Quality Assessment**

Building Flush	Notes
Was the Flush an Occupied or Unoccupied Flush?	
Minimum Air Temperature	60°F
Maximum Air Temperature	80°F
Maximum Humidity	60%

Occupancy Date
 Building Flush Start Date
 Building Flush Completion Date
 Total Building Area
 Total Cubic Feet of Air Required
 Total Cubic Feet of Air Required prior to Occupancy
 Total Cubic Feet of Air Provided
 Total Cubic Feet of Air Provided prior to Occupancy

Indoor Environment Quality per Section 5.8**Air Quality Testing**

Occupancy Date

Air Quality Test Date

Per LEED v. 4 standards, Conduct air quality testing consistent with the table below to demonstrate contaminants do not exceed permitted levels.

Table 1. Maximum concentration levels, by contaminant and testing method

Contaminant	Maximum concentration	Maximum concentration (Healthcare only)	ASTM and U.S. EPA methods	ISO method
Formaldehyde	27 ppb	16.3 ppb	ASTM D5197; EPA TO-11 or EPA Compendium Method IP-6	ISO 16000-3
Particulates (PM10 for all buildings; PM2.5 for buildings in EPA nonattainment areas, or local equivalent)	PM10: 50 micrograms per cubic meter PM2.5: 15 micrograms per cubic meter	20 micrograms per cubic meter	EPA Compendium Method IP-10	ISO 7708
Ozone (for buildings in EPA nonattainment areas)	0.075 ppm	0.075 ppm	ASTM D5149 - 02	ISO 13964
Total volatile organic compounds (TVOCs)	500 micrograms per cubic meter	200 micrograms per cubic meter	EPA TO-1, TO-15, TO-17, or EPA Compendium Method IP-1	ISO 16000-6
Target chemicals listed in CDPH Standard Method v1.1, Table 4-1, except formaldehyde	CDPH Standard Method v1.1–2010, Allowable Concentrations, Table 4-1	CDPH Standard Method v1.1–2010, Allowable Concentrations, Table 4-1	ASTM D5197; EPA TO-1, TO-15, TO-17, or EPA Compendium Method IP-1	ISO 16000-3, 16000-6
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	9 ppm; no more than 2 ppm above outdoor levels	EPA Compendium Method IP-3	ISO 4224

ppb = parts per billion; ppm = parts per million; µg/cm = micrograms per cubic meter

Conduct all measurements before occupancy but during normal occupied hours, with the building ventilation system started at the normal daily start time and operated at the minimum outdoor airflow rate for the occupied mode throughout the test.

For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.



Indoor Environment Quality per Section 5.8

Low Emitting Materials

[illegible]

Access to Daylight and Views

Number of regularly occupied spaces	2
Number of regularly occupied spaces with direct access to views*	1
Number of regularly occupied spaces with indirect access to views*	1
Total % of areas with access to views	100%

Indoor Enviromental Quality per Section 5.8

Low Emitting Materials VOC Limits

Paints / Coatings	g/L	Standard
Flat Paint	50	GS-11
Non-Flat Paint	150	GS-11
Anti-Corrosive / Rust Paint	250	GC-03
Bond Breakers	350	SCAQMD 1113
Clear Wood Finishes	275	SCAQMD 1113
Varnish	275	SCAQMD 1114
Sanding Sealers	275	SCAQMD 1115
Lacquer	275	SCAQMD 1116
Concrete-Curing Compounds	100	SCAQMD 1117
Concrete Curing Compounds for Roadways and Bridges	350	SCAQMD 1119
Concrete Surface Retarder	250	SCAQMD 1121
Driveway Sealer	50	SCAQMD 1122
Dry-Fog Coatings	150	SCAQMD 1123
Faux Finishing Coatings		SCAQMD 1124
Clear Topcoat	200	SCAQMD 1125
Decorative Coatings	350	SCAQMD 1126
Glazes	350	SCAQMD 1127
Japan	350	SCAQMD 1128
Trowel Applied Coatings	150	SCAQMD 1129
Fire-Proofing Coatings	350	SCAQMD 1130
Flats	50	SCAQMD 1131
Floor Coatings	50	SCAQMD 1132
Form Release Compound	250	SCAQMD 1133
Graphic Arts (Sign) Coatings	500	SCAQMD 1134
Industrial Maintenance (IM) Coatings	100	SCAQMD 1135
High Temperature IM Coatings	420	SCAQMD 1113
Non-Sacrificial Anti-Graffiti Coatings	100	SCAQMD 1113
Zinc-Rich IM Primers	100	SCAQMD 1113
Magnesite Cement Coatings	450	SCAQMD 1113
Mastic Coatings	300	SCAQMD 1113
Metallic Pigmented Coatings	500	SCAQMD 1113
Multi-Color Coatings	250	SCAQMD 1113
Nonflat Coatings	50	SCAQMD 1113
Pre-Treatment Wash Primers	420	SCAQMD 1113
Primers, Sealers, and Undercoaters	100	SCAQMD 1113
Reactive Penetrating Sealers	350	SCAQMD 1113
Recycled Coatings	250	SCAQMD 1113
Roof Coatings	50	SCAQMD 1113
Roof Coatings, Aluminum	100	SCAQMD 1113
Roof Primers, Bituminous	350	SCAQMD 1113
Rust Preventative Coatings	100	SCAQMD 1113
Sacrificial Anti-Graffiti Coatings	50	SCAQMD 1113

Indoor Environmental Quality per Section 5.8**Low Emitting Materials VOC Limits**

Shellac		SCAQMD 1113
Clear	730	SCAQMD 1113
Pigmented	550	SCAQMD 1113
Specialty Primers	100	SCAQMD 1113
Stains	100	SCAQMD 1113
Stains, Interior	250	SCAQMD 1113
Stone Consolidant	450	SCAQMD 1113
Swimming Pool Coatings		SCAQMD 1113
Repair	340	SCAQMD 1113
Other	340	SCAQMD 1113
Traffic Coatings	100	SCAQMD 1113
Waterproofing Sealers	100	SCAQMD 1113
Waterproofing Concrete/Masonry Sealers	100	SCAQMD 1113
Wood Preservatives	350	SCAQMD 1113

Adhesives / Sealants	g/L	Standard
Carpet Adhesive	50	SCAQMD 1168
Wood Flooring Adhesive	100	SCAQMD 1168
Rubber Floor Adhesive	60	SCAQMD 1168
Subfloor Adhesives	50	SCAQMD 1168
ceramic Tile Adhesive	65	SCAQMD 1168
VCT and Asphalt Adhesive	50	SCAQMD 1168
Drywall Panel Adhesive	50	SCAQMD 1168
Cove Base Adhesive		SCAQMD 1168
Multi-Purpose Construction Adh.	70	SCAQMD 1168
Structural Glazing Adh.	100	SCAQMD 1168

Specialty Adhesives	g/L	Standard
PVC Welding	510	SCAQMD 1168
CPVC Weldin	490	SCAQMD 1168
ABS Welding	325	SCAQMD 1168
Plastic Cement Weldin	250	SCAQMD 1168
Adhesive Primer for Plastic	550	SCAQMD 1168
Contact Adhesive	80	SCAQMD 1168
Structural Wood Adhesive	140	SCAQMD 1168
Top and Trim Adhesive	250	SCAQMD 1168

Substrate Specific Adhesives	g/L	Standard
Metal to Metal	30	SCAQMD 1168
Plastic foams	50	SCAQMD 1168
Porous Materil	50	SCAQMD 1168
Wood	30	SCAQMD 1168
Fiberglass	80	SCAQMD 1168

Indoor Environmental Quality per Section 5.8**Low Emitting Materials VOC Limits**

Sealants and Primers	g/L	Standard
Architectural	250	SCAQMD 1168
Nonmembrane Roof	300	SCAQMD 1168
Single-Ply Roof	450	SCAQMD 1168
Architectural, Nonporous Primer	250	SCAQMD 1168
Architectural Porous Primer	775	SCAQMD 1168

Aerosol Adhesives	g/L	Standard
General Purpose Mist Spray	65%	VOC by weight
General Purpose Web Spray	55%	VOC by weight
Special Purpose	70%	VOC by weight



HPBS Appendix H – Incentives and Rebates Process Guidelines

Both Rocky Mountain Power (RMP) and Questar Gas (QG) have cash incentives available to building owners for the installation of energy efficient equipment and systems in New Construction Projects. It is DFCM's intent to obtain, in a timely manner, all possible gas and electric utility incentives/rebates for the *prescriptive or typical* measures included in their new building projects. *Prescriptive* energy efficiency measures are defined as those that propose equipment/systems that exceed existing building energy code and have incentives or rebates paid based on the type, size, and quantities of high efficiency equipment installed.

Custom energy efficiency measures (EEMs), which require supporting engineering calculations to quantify energy savings, are to be identified and handled by the design team by reporting them, as soon as they are identified, to the DFCM Energy Program Director who will coordinate with the proper utility (Questar Gas or Rocky Mountain Power). The utilities will then hire independent consultants to quantify the savings and available incentives for those custom measures. Some examples of custom measures are:

- 1) Rocky Mountain Power
 - a. Capital measures (NC, \$.015/kWh saved, 70% project cost cap, 1-year SPB cap)
 - i. Lighting – even if you don't meet -10% to Code
 - ii. High efficiency chillers (non-HVAC)
 - iii. Water side economizers
 - iv. Precoolers (evap coolers for air entering air cooled chillers)
 - v. Air/Air heat recovery (where not required by Code)
 - vi. Economizers for data centers or data rooms
 - vii. VFDs where not required by Code
 - viii. DCV in parking garages
 - ix. Evaporative cooling, not covered by prescriptive measures
 - b. Energy Management measures (must exceed Code or industry standard practice)
 - i. Equipment Scheduling and night setback controls
 - ii. Chiller sequencing
 - iii. Condenser water reset
 - iv. Night cool down strategies
- 2) Questar Gas (GS rate schedule only)
 - a. Simplified analyses (NC, \$1.00/ therm saved, 50% of eligible cost cap)
 - i. Boiler controls
 - ii. ERVs
 - iii. Pipe insulation
 - b. Custom Measures (NC, \$1.00/ therm saved, 50% of eligible cost cap)
 - i. Hot water heat recovery off refrigerant condensers, etc.
 - ii. Combustion air preheat for boilers
 - iii. Make-up water preheat for boilers
 - iv. Air to air heat recovery (where not required by Code)
 - v. Solar hot water heating
 - vi. Energy management control upgrades (must exceed Code or industry standard practice)

Custom measures are not further addressed in this Section.

New Building Design team members are required to become participants in Rocky Mountain Power's Energy Efficiency Alliance Program. Please note key information about that Program below:

- 1) It is free to join, it simply requires an application to be filled out
- 2) A firm only needs to join once to be active participants in all future design projects
- 3) Participation allows the design teams to use the utilities' available tools to automatically determine energy savings, economic payback and incentives for prescriptive energy conservation measures. These tools can be useful to the design team in choosing the best energy efficiency alternatives.
- 4) The (RMP) tools *automatically* generate applications for available incentives from the utilities
- 5) Companies become EEA Participants to streamline the incentive process and get the full *benefit* of the tools

The efforts outlined in this section do not replace or supersede DFCM's High Performance Building Standards (HPBS). The energy requirements and protocols outlined within the HPBS are in addition to those outlined herein. The purpose of this section is strictly to address and maximize the acquisition of financial rebates for energy efficiency upgrades from the local utility programs.

Before beginning on design efforts for new facilities, the design team should review the following list, which is a comprehensive summary of all systems/equipment that are currently eligible for incentives from the gas and electric utility companies (Rocky Mountain Power = RMP, Questar Gas = QG). DFCM expects the installation of these systems/equipment to be incorporated into their new building designs where appropriate, unless it *can be shown* that they are not energy life cycle cost effective (as defined in section 5.5). Equipment required by the current Code is not available for incentives.

1. Envelope
 - a. Window film (RMP incentives)
 - b. Cool roof (RMP incentives)
 - c. Increased wall/roof Insulation (both Questar and RMP have requirements)
 - d. High efficiency windows (both Questar and RMP have requirements)
2. Electric HVAC (RMP incentives)
 - a. Unitary HVAC, heat pumps
 - b. High efficiency chillers
 - c. IDEC and evaporative cooling systems
 - d. VFD air compressors
 - e. Electrically commutated motors
 - f. HVAC pump VFDs
 - g. HVAC fan VFDs
 - h. High efficiency PTAC/PTHP
 - i. High efficiency AC
 - j. Evaporative coolers
 - k. Programmable thermostats (365 day for portable classrooms)
 - l. Occupancy based PTHP/PTAC controls
3. GAS HVAC (QG incentives)
 - a. Outside air temperature based reset controls (where not req'd by Code)
 - b. Gas burning HVAC (unit heaters, infrared heaters, furnaces, boilers)

4. GAS water heating equipment (QG)
 - a. Gas fired water heaters
 - b. Storage type
 - c. Tankless
 - d. Condensing
 - e. Hybrid gas storage
 - f. Direct contact water heaters
5. Kitchen equipment
 - a. Efficient *electric* cooking equipment (RMP)
 - i. Steam cooker
 - ii. Convection oven
 - iii. Combination oven
 - iv. Commercial fryer
 - b. Other efficient electric food service equipment (RMP)
 - i. Commercial Dishwasher
 - ii. Insulated holding cabinet
 - iii. Ice machines (air cooled)
 - iv. Residential dishwasher or refrigerator used in business
 - v. Efficient commercial refrigerator/freezer/cases
 - vi. Glass door refrigerator
 - vii. Glass door freezer
 - viii. Solid door refrigerator
 - ix. Solid door freezer
 - x. High efficiency beverage vending machine
 - xi. LED case lighting
 - xii. Refrigerated case occupancy sensor
 - c. Efficient *gas burning* cooking equipment (QG)
 - i. Commercial Fryer
 - ii. Steam cooker
 - iii. Convection Oven
 - iv. Griddle
 - v. High efficiency pre-rinse spray valve (dishwasher)
6. Lighting (RMP)
 - a. Interior lighting
 - b. Exterior Lighting
 - c. Induction fixtures
 - d. LED outdoor area and roadway fixtures
 - e. CFL wall packs
 - f. Lighting controls

Nexant (Salt Lake City office) and Evergreen Consulting Group serve as the utilities' Outreach Teams, and as such are available to assist with questions on the incentive process and what equipment specifically does/does not qualify. While these firms serve as a resource to assist the design team when they have questions, they do not have the responsibility of obtaining incentives. The responsibility for obtaining incentives lies with the owner and those hired by the owner (in this case the Project Design Team).

Refer to the Energy Efficiency Alliance link for all the forms, resources, applications, program information, and other resources for additional information for both lighting and non-lighting projects.

<http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>

More specifics on prescriptive utility incentives can be found at the following web sites

<http://www.thermwise.com/business/BusinessRebateApplications.php>

<http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>

The outline below, and Appendix I provided (Incentives and Rebates Responsibility Matrix), provide a road map for how the project's *prescriptive* measure incentives are to be obtained. Deviations from the process outlined below must be approved by DFCMs Energy Program Director. This outline defines roles and responsibilities for design team members as well the Commissioning Agent, who will ultimately gather the final equipment submittal data needed to complete the incentive procurement process.

1. Design Phase

a. Architect

i. Architect is the point of contact to reach the new building owner

1. Obtains all owner and project identification information needed

- a. Project name
- b. Contact name
- c. Phone
- d. Email address
- e. Project site address
- f. Type of business
- g. Utility bill/account info (rate schedule, meter number if known)
- h. Project contact names and contact info for:

- i. Architect
- ii. Mechanical Engineer
- iii. Electrical Engineer
- iv. Kitchen Designer
- v. Lighting Engineer
- vi. General Contractor
1. Project Manager
- vii. Commissioning Agent

2. Provides this information to Nexant Outreach tradeoutreach@nexant.com

- a. Nexant Outreach then emails rate schedule information to all design teams (for use in utility provided tools).

3. Obtains or coordinates acquisition of all the information required on the *Questar ThermWise Rebate Application and the RMP wattsmart Business General Application Forms*

<http://www.thermwise.com/business/BusinessRebateApplications.php>

<http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>

- a. Architect gets information and fills out forms and gets Owner signatures



- b. At project completion, architect sends *completed* forms to Nexant Outreach
 - ii. Architect is ultimately responsible for the design team performing their assigned tasks.
 - 1. Architect and Nexant Outreach will be in contact with respect to progress and problems encountered in the rebate processing process
 - iii. Identify all additional features of the new building that are prescriptive measures eligible for incentives
 - 1. See Responsibility column, designation A, Appendix I, (Project EEMs Incentive/Rebate Summary table).
 - iv. If available prescriptive measures are *not* incorporated into the design, be prepared to show why they are not life-cycle cost effective, per Section 5.5, or why they do not meet owners design intent.
 - v. Provide COMcheck for the new building envelope features to Nexant Outreach
 - vi. Gather information from design teams and provide a compiled list of *all* prescriptive measures incorporated into the new building design to Nexant Outreach, the DFCM Energy Program Director and the Commissioning Agent.
- b. Mechanical Designer
 - i. Fill out RMP provided tools for all prescriptive measures in the project involving potential incentives
 - 1. See Appendix I, measures with a "Yes" in column 3.
 - ii. Utilize economic data provided by these tools in the design decision making process
 - iii. If prescriptive measures are not incorporated into the design, be prepared to show why they are not life-cycle cost effective, per HPBS Section 5.5, or why they do not meet owners design intent.
 - iv. Utilize tool features to *automatically* produce an RMP incentive application and submit to Nexant Outreach
 - v. Identify all additional prescriptive measures in the project (*not* requiring tools to be filled out).
 - 1. See Responsibility column, designation M, Appendix I, (Project EEMs Incentive/Rebate Summary table).
 - vi. Provide to the architect information on all mechanical prescriptive measures incorporated into the new facility design by completing all appropriate columns in Appendix Y provided.
 - vii. Provide mechanical equipment schedule drawings to Nexant Outreach
- c. Kitchen Designer (where applicable)
 - i. Identify all prescriptive kitchen equipment measures in the project
 - 1. See Responsibility column, designation K, Appendix I, (Project EEMs Incentive/Rebate Summary table).
 - ii. Provide to the architect information on all kitchen/cooking equipment prescriptive measures incorporated into the new facility design by completing all appropriate columns in Appendix I provided.
 - iii. If prescriptive kitchen equipment measures are not incorporated into the design, be prepared to document why they are not life-cycle cost effective, per Section 5.5, or why they do not meet owners design intent.

- iv. Provide kitchen equipment schedule drawings to Nexant Outreach
 - d. Electrical designer
 - i. Fill out RMP Lighting Tool for all qualifying lighting fixtures
 - 1. Insure proposed lighting power density beats Code by at least 10%
 - ii. Utilize economic data provided by tools in the design decision making process
Utilize tool features to *automatically* produce an incentive application and submit to Evergreen Consulting Group
(<http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>)
 - iii. If prescriptive lighting measures are not incorporated into the design, be prepared to document why they are not energy life-cycle cost effective, per section 5.5, or why they do not meet owners design intent.
 - iv. Identify all additional qualifying prescriptive lighting measures in the project (*not* requiring tools to be filled out)
 - 1. Exterior Lighting
 - a. Induction fixtures
 - b. LED outdoor area and roadway fixtures
 - c. CFL wall packs
 - d. Lighting controls
 - v. Provide a list of all exterior lighting typical measures to Evergreen Lighting Outreach
 - vi. Notify the Architect that the project incorporates new or retrofit prescriptive lighting measures.
 - vii. Provide COMcheck for Lighting to Evergreen Consulting Group
<http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>
 - viii. Provide lighting schedules from drawings to Evergreen Lighting Outreach
- 2. Construction Phase
 - a. Nexant Outreach
 - i. Keep architect informed of progress and problems in the incentive acquisition process with respect to anything missing from the *design* phase.
 - 1. In kind, the architect should keep Nexant Outreach informed of any design changes, such as EEMs/equipment that were removed or altered during the value engineering process
 - ii. Coordinate with CA to facilitate the final stages of incentive processing.
 - iii. Pursue all AHRI Certificates as necessary once final equipment submittals are accepted and provided.
 - b. Commissioning Agent (CxA)
 - i. Oversight of the final incentive process flow of information from subcontractors and General Contractor to Nexant Outreach
 - 1. Reports to Owner problems encountered in getting information.
 - ii. Gathering of all final submittal data, primarily cut sheets on approved equipment, for all prescriptive measures intended for incentives (based on compiled Appendix I received from Architect). This information will be provided to Nexant Outreach for final rebate processing.

- iii. Timeline requirement – Provide above information to Nexant Outreach within 2 weeks of final equipment submittal approvals.
- iv. Specific Submittal Requirements (which CxA must filter from all the project submittals)
 - 1. Note: Measures that are required by Code are not eligible for rebates through Rocky Mountain Power or Questar Gas
 - 2. Nexant will send Appendix I to the CxA, which includes all the submittal requirements for each type of measure. Along with the information provided to the CA in Section 2bii. above, this will be used by the CA to glean the needed information out of all the project submittals.
 - 3. Only required submittal information is to be passed over to Nexant Outreach by the CxA. Providing unsorted, unorganized or irrelevant project submittals to Nexant Outreach *is not acceptable*. One or two cut sheets per implemented measure is usually all that is needed to verify energy efficient equipment meets program requirements.

3. Closeout

- a. Once Nexant and Evergreen Outreach teams have received all the required applications (from design team) and measure specific submittal information (from the Commissioning Agent), they will complete final rebate/incentive processing for all available Questar Gas and Rocky Mountain Power incentives.
- b. Architect to provide complete and updated Appendix I for the project to DFCM Energy Program Director.
- c. Nexant Outreach approves the process as complete, (this is a *prerequisite for final retainage payment to be made to the Design Team and CA for services provided*).



Roles and Responsibilities

Incentive Process Task	Owner	Architect	Mechanical Design	Kitchen Design	Electrical Design	Commissioning Agent	Evergreen Lighting Outreach (1)	Nexant Outreach Team (1)
Getting necessary information from Owner for Applications and Agreements		x						
Signing General Applications	x							
Become EEA Participants		x	x	x	x			x
Ultimate responsibility for insuring the various design disciplines perform their assigned tasks		x						
Responsible parties assigned per discipline, firm or organization		x						x
Keeps Architect apprased of progress of incentive processing								x
Fill out RMP tools for any prescriptive measures involving the <i>building envelope</i> that have tools		x						
<i>Envelope</i> tools automatically create applications for incentives, send these to Nexant Outreach Team		x						x
Identify all features of the <i>building envelope</i> that are eligible for prescriptive incentives (no tools req'd)		x						
Get list of all envelope prescriptive measures to Nexant Outreach Team		x						
Get COMcheck for envelope to Nexant Outreach Team		x						
Fill out RMP tools for all prescriptive measures involving <i>mechanical systems</i> that have tools			x					
<i>Mechanical</i> tools automatically create applications for incentives, send these to Nexant Outreach Team			x					x
Identify all <i>mechanical</i> systems (gas and electric) that are eligible for prescriptive incentives (no tools req'd)			x					
Get list of all mechanical prescriptive measures to Nexant Outreach Team			x					
Get Mechanical equipment schedule drawing to Nexant Outreach Team			x					
Identify all <i>Kitchen equipment</i> (gas and electric) that is eligible for prescriptive incentives (no tools req'd)				x				
Get list of all kitchen prescriptive measures to Nexant Outreach Team				x				
Fill out RMP tools for all prescriptive measures involving <i>lighting systems</i> that have tools					x		x	
<i>Lighting</i> tools automatically create applications for incentives, submit these to Evergreen Outreach Team					x		x	
Identify all <i>lighting</i> that is eligible for prescriptive incentives (no tools req'd)					x		x	
Get list of all lighting prescriptive measures to Evergreen Outreach					x			
Get COMcheck for lighting to Evergreen Outreach					x			
Evergreen Outreach should share <i>lighting</i> measures included in the project with Nexant Outreach for tracking							x	x
A compiled list of all prescriptive measures in the project is provided by Nexant to the Commissioning Agent								x
Gather all final submittal data needed by Nexant Outreach Team (Envelope, mechanical, kitchen and electrical)						x		
Deliver all final submittal data to Nexant Outreach team						x		
Obtain AHRI certificates where applicable								x
Incentives for PC management, smart plug strips, laundry machines and other appliances	x							

Notes: (1) please go to <http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jsp/Forms.jsp>

design phase
construction phase

Quantity/Specs of Qualified Typical Measures in Project									
Exists in	Qualified?	Tool?	Responsible Party	Project Name:	Utility		Person filling out form:		
					RMP	QG	Size	Other Spec	Quantity
				Typical Energy Efficiency Measures					Notes
		Y	Arch	Cool roof	x				SF
		Y	Arch	Increased wall insulation	x	x	R		SF
		Y	Arch	Increased roof insulation	x	x	R		SF
		Y	Arch	High efficiency windows	x	x			SF
			Arch	Window film	x				SF
				Wattsmart HVAC					
		Y	Mech	High efficiency Unitary HVAC	x		btuh	EER	ea.
		Y	Mech	High efficiency heat pumps	x		btuh	EER	ea.
		Y	Mech	High efficiency chillers	x		tons	IPLV (kW/Ton)	ea.
		Y	Mech	IDECE systems	x		cfm		ea.
		Y	Mech	Evaporative cooling systems	x		cfm		ea.
		Y	Mech	VFD air compressors	x		hp		ea.
		Y	Mech	Electrically commutated motors (ECMs)	x		hp		ea.
		Y	Mech	HVAC pump VFDs	x		hp		ea.
		Y	Mech	HVAC fan VFDs	x		hp		ea.
		Y	Mech	High efficiency PTAC	x		btuh	EER	ea.
		Y	Mech	High efficiency PTHP	x		btuh	EER	ea.
		Y	Mech	High efficiency AC	x		btuh	EER	ea.
		Y	Mech	Evaporative coolers	x		cfm		ea.
			Mech	Programmable thermostats (365 day for portable classrooms)	x		na		ea.
			Mech	Occupancy based PTHP/PTAC controls	x		na		ea.
			Mech	Appliances and Office Equipment	x		na		ea.
				ThermWise Rebates					
			Mech	Outside air temperature based reset controls		x	na		ea.
			Mech	Gas burning unit heaters		x	btuh		ea.
			Mech	Gas burning infrared heaters		x	btuh		ea.
			Mech	Gas burning furnaces		x	btuh		ea.
			Mech	Gas burning boilers		x	btuh		ea.
			Mech	Gas fired water heaters		x	btuh		ea.
			Mech	Storage type water heaters		x	btuh		ea.
			Mech	Tankless water heaters		x	btuh		ea.
			Mech	Condensing water heaters		x	btuh		ea.
			Mech	Hybrid gas storage water heaters		x	btuh		ea.
			Mech	Direct contact water heaters		x	btuh		ea.
				wattsmart Food Service					
			Kitch/Mech	Efficient electric steam cooker	x				ea.
			Kitch/Mech	Efficient electric convection oven	x				ea.
			Kitch/Mech	Efficient electric combination oven	x				ea.
			Kitch/Mech	Efficient electric griddle	x				ea.
			Kitch/Mech	Efficient electric commercial fryer	x				ea.
			Kitch/Mech	Insulated holding cabinet	x				ea.
			Kitch/Mech	High efficiency Commercial Dishwasher	x				ea.
			Kitch/Mech	High efficiency Glass door refrigerator	x				ea.
			Kitch/Mech	High efficiency Glass door freezer	x				ea.
			Kitch/Mech	High efficiency Solid door refrigerator	x				ea.
			Kitch/Mech	High efficiency Solid door freezer	x				ea.
			Kitch/Mech	Ice machines (air cooled)	x				ea.
			Kitch/Mech	High efficiency residential dishwasher or refrigerator used in business	x				ea.
			Elec	LED case lighting	x				ea.
			Kitch/Mech	Refrigerated case occupancy sensor	x				ea.



Quantity/Specs of Qualified Typical Measures in Project									
Exists in	Qualified?	Tool?	Responsible Party	Project Name:	Utility		Person filling out form: Phone:		
				Typical Energy Efficiency Measures	RMP	QG	Size	Other Spec	Quantity
				Notes					
				ThermWise Food Service					
			Kitch/Mech	Efficient Gas Commercial Fryer		x			ea.
			Kitch/Mech	Efficient Gas Steam cooker		x			ea.
			Kitch/Mech	Efficient Gas Convection Oven		x			ea.
			Kitch/Mech	Efficient Gas Griddle		x			ea.
			Kitch/Mech	High efficiency pre-rinse spray valve		x			ea.
				wattsmart Lighting					
		Y		Lighting (New Construction - Major Renovation)	x		Lighting Incentive Catalog		New Const. Lighting Application Process
		Y	Elec						Lighting - Post-purchase application
		Y		Lighting (Retrofit) PRE-INSTALLATION INSPECTION REQUIRED*	x		Lighting Incentive Catalog		RMP Retrofit Lighting Application Process
			Elec						wattsmart Business General Application

Submittal Requirements by Measure					
Prescriptive Energy Efficiency Measure	Utility		Spec Docs	Proof of Payment	Utah Incentive Submittal Requirements RMP Non-Lighting Post-Purchase Incentive Application Process
	RMP	QG			
Cool roof	x				RMP: Building Envelope
Wall/Roof Insulation (New Construction)	x				RMP: Building Envelope
		x			QG: Roof/Wall Insulation (New Construction) application
Wall/Roof Insulation (Retrofit)	x				RMP: Building Envelope
		x			QG: Roof/Wall Insulation (Retrofit) application
High Efficiency Windows (New Construction)	x				RMP: Building Envelope
		x			QG: Windows (New Construction) application
High efficiency windows (Retrofit)	x				RMP: Building Envelope
		x			QG: Windows (Retrofit) application
Window film (Retrofit Only)	x				RMP: Building Envelope
wattsmart HVAC					
High efficiency Unitary HVAC	x				HVAC – Air-conditioners & Heat Pumps application
High efficiency heat pumps	x				HVAC – Air-conditioners & Heat Pumps application
High efficiency chillers	x				HVAC - Chiller application
IDEC systems	x				Direct/Indirect Evaporative Cooling application
Evaporative cooling systems	x				Direct/Indirect Evaporative Cooling application
VFD air compressors	x				Compressed Air application
Electrically commutated motors (ECMs)	x				Motors & VFDs application
HVAC pump VFDs	x				Motors & VFDs application
HVAC fan VFDs	x				Motors & VFDs application
High efficiency PTAC	x				HVAC - Misc. application
High efficiency PTHP	x				HVAC - Misc. application
High efficiency AC	x				HVAC - Misc. application
Evaporative coolers	x				Evaporative Cooling application
Programmable thermostats (365 day for portable classrooms)	x				HVAC - Misc. application
Occupancy based PTHP/PTAC controls	x				HVAC - Misc. application
Appliances and Office Equipment	x				Appliances and Office Equipment application



Submittal Requirements by Measure					
Prescriptive Energy Efficiency Measure	Utility		Spec Docs	Proof of Payment	Utah Incentive Submittal Requirements RMP Non-Lighting Post-Purchase Incentive Application Process
	RMP	QG			
ThermWise Rebates					
Outside air temp. based reset controls		x			ThermWise HVAC application
Gas burning unit heaters		x			ThermWise HVAC application
Gas burning infrared heaters		x			ThermWise HVAC application
Gas burning furnaces		x			ThermWise HVAC application
Gas burning boilers		x			ThermWise HVAC application
Storage type water heaters		x			ThermWise HVAC application
Gas fired water heaters		x			ThermWise Water Heater application
Tankless water heaters		x			ThermWise Water Heater application
Condensing water heaters		x			ThermWise Water Heater application
Hybrid gas storage water heaters		x			ThermWise Water Heater application
Direct contact water heaters		x			ThermWise Water Heater application
wattsmart Food Service					
Efficient electric steam cooker	x				Food Service - Cooking Equipment application
Efficient electric convection oven	x				Food Service - Cooking Equipment application
Efficient electric combination oven	x				Food Service - Cooking Equipment application
Efficient electric commercial fryer	x				Food Service - Cooking Equipment application
High efficiency Commercial Dishwasher	x				Food Service - Cooking Equipment application
Insulated holding cabinet	x				Food Service - Cooking Equipment application
Ice machines (air cooled)	x				Food Service - Dishwashers application
High efficiency residential dishwasher or refrigerator used in a business	x				Food Service - Refrigerators, Freezers & Ice Machines
High efficiency Glass door refrigerator	x				Food Service - Refrigerators, Freezers & Ice Machines
High efficiency Glass door freezer	x				Food Service - Refrigerators, Freezers & Ice Machines
High efficiency Solid door refrigerator	x				Food Service - Refrigerators, Freezers & Ice Machines
High efficiency Solid door freezer	x				Food Service - Refrigerators, Freezers & Ice Machines
LED case lighting	x				Food Service - Refrigerated Case Lighting application
Refrigerated case occupancy sensor	x				Food Service - Refrigerated Case Lighting application

Submittal Requirements by Measure					
Prescriptive Energy Efficiency Measure	Utility		Spec Docs	Proof of Payment	Utah Incentive Submittal Requirements RMP Non-Lighting Post-Purchase Incentive Application Process
	RMP	QG			
ThermWise Food Service					
Efficient Gas Commercial Fryer		x			ThermWise Food Service Equipment Application
Efficient Gas Steam cooker		x			ThermWise Food Service Equipment Application
Efficient Gas Convection Oven		x			ThermWise Food Service Equipment Application
Efficient Gas Griddle		x			ThermWise Food Service Equipment Application
High efficiency pre-rinse spray valve		x			ThermWise Food Service Equipment Application
wattsmart Lighting					
Lighting (New Construction - Major Renovation)	x		Lighting Incentive Catalog		New Const. Lighting Application Process Lighting - Post-purchase application
Lighting (Retrofit) PRE-INSTALLATION INSPECTION REQUIRED*	x		Lighting Incentive Catalog		RMP Retrofit Lighting Application Process wattsmart Business General Application



UTAH STATE DEVELOPMENTAL CENTER EXISTING CAMPUS UTILITIES

DFCM PROJECT NUMBER: HD94217

895 NORTH 900 EAST
AMERICAN FORK, UTAH 84003

DATE: DECEMBER 1995

FOR

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES
**DIVISION OF FACILITIES CONSTRUCTION
AND MANAGEMENT**

4110 STATE OFFICE BUILDING / SALT LAKE CITY, UTAH 84114 / 538-3018

DRAWING INDEX

COVER SHEET
SP-1 OVER ALL SITE PLAN

UTILITIES PLANS
SP-1 OVER ALL SITE PLAN
SP-2 SPRINKLER WATER LINES
SP-3 SANITARY LINES
SP-4 SEWER LINES
SP-5 EXISTING STEAM AND CONDENSATE LINES
SP-6 EXISTING FIRE ALARM SYSTEM
SP-7 EXISTING COMPUTER LINES (FIBER & COPPER)
SP-8 EXISTING PHONE LINES
SP-9 EXISTING POWER SOURCES
SP-10 EXISTING 120/240 V. POWER
SP-11 EXISTING 480/277 V. POWER
SP-12 EXISTING 120/208 V. POWER
SP-13 EXISTING EMERGENCY ELECTRICAL POWER
SP-14 EXISTING SITE LIGHTING

10/17/2000 UP-DATE

OWNER

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES
DIVISION OF FACILITIES CONSTRUCTION
AND MANAGEMENT

4110 STATE OFFICE BUILDING
SALT LAKE CITY, UTAH 84114
538-3018

PROJECT MANAGER: MARK CURTIS

APPROVALS

John Gordon
Director, Division of Facilities Construction and Management
Signature: _____ Date: _____

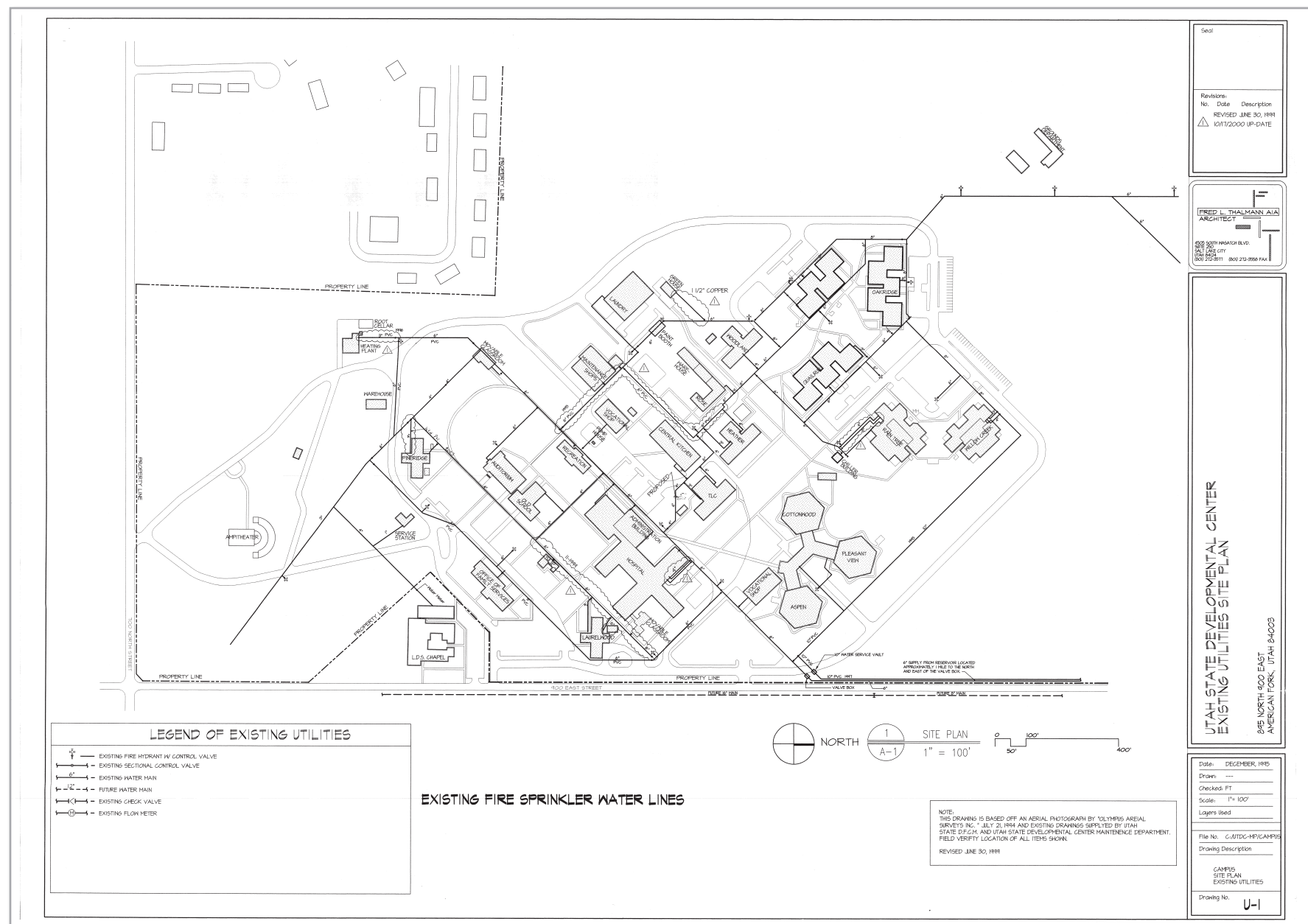
Division of Facilities Construction and Management
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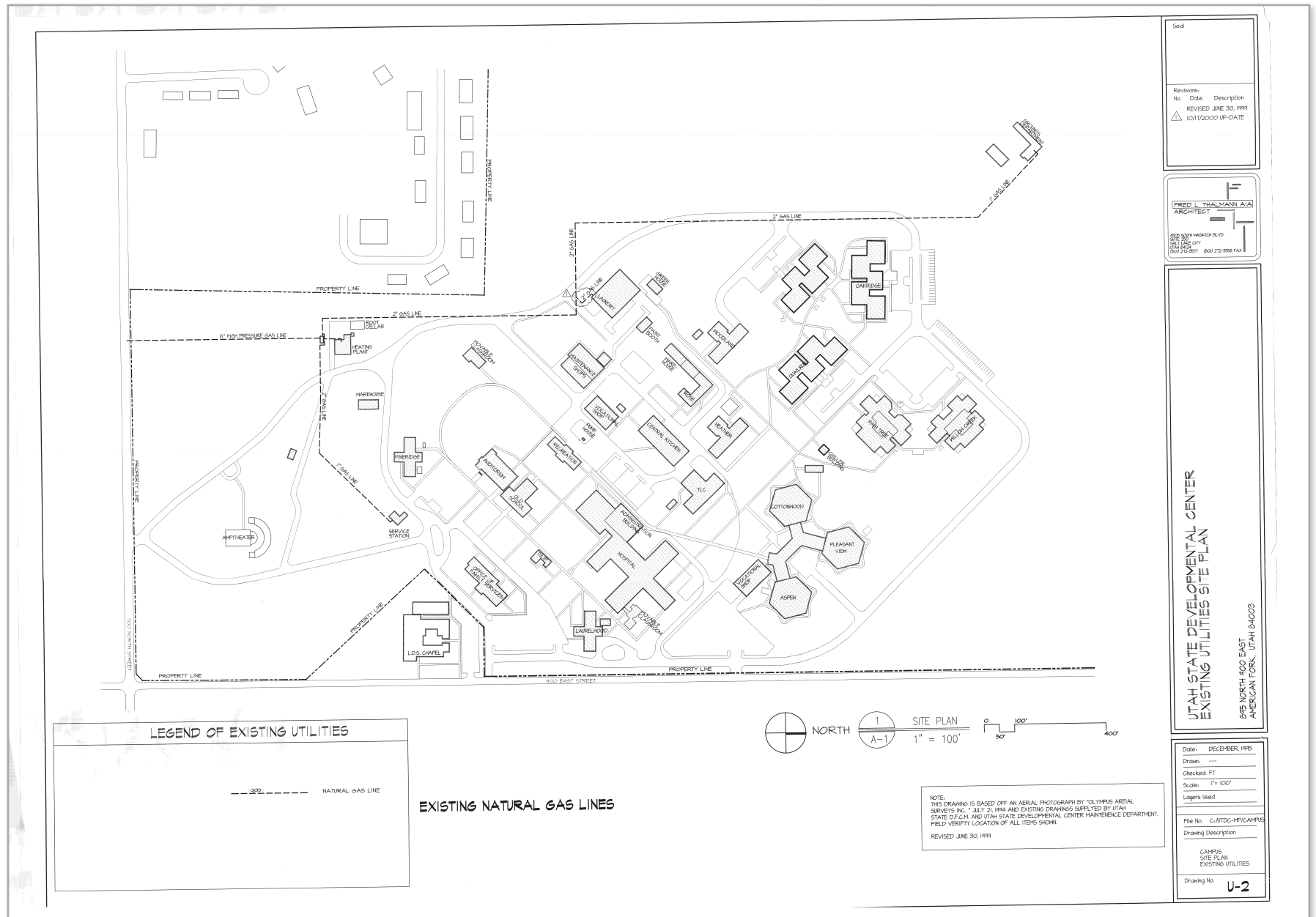
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NIKE JARVIS
Ran Olson
595 N. 900 E.
AMERICAN FORK, UT.
374-3113 84003

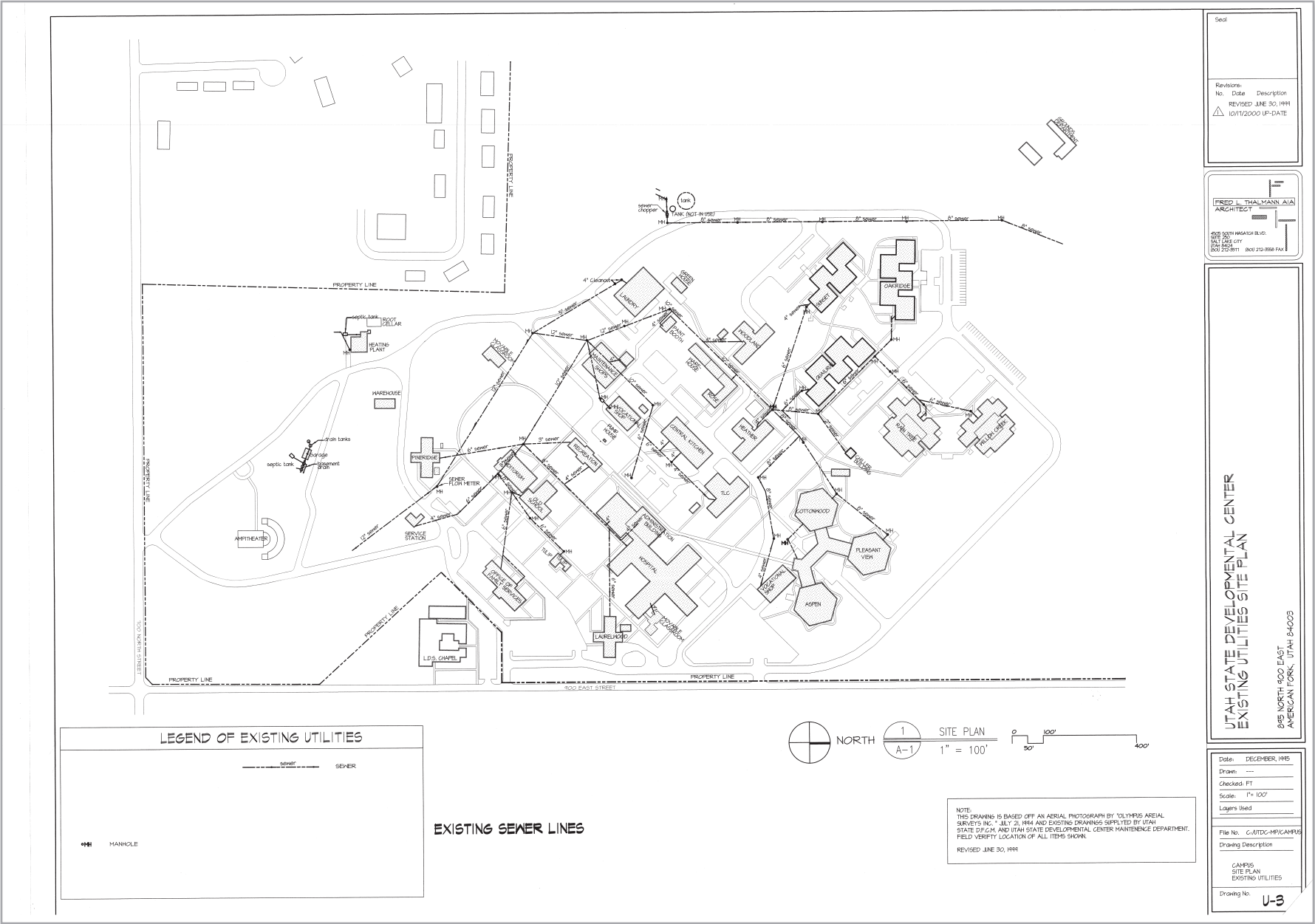
**FRED L. THALMANN AIA
ARCHITECT**

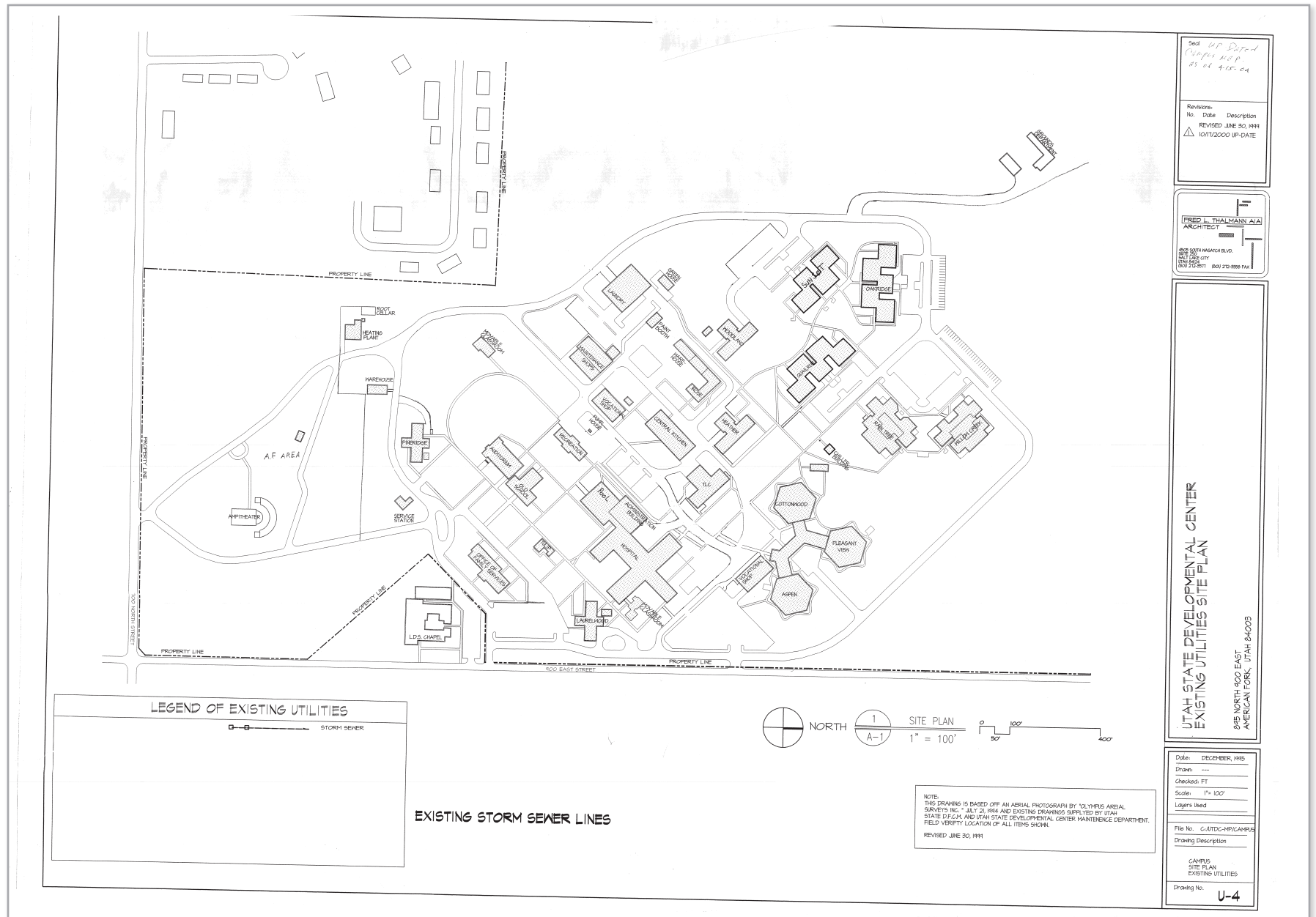
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SUITE 200
SALT LAKE CITY
UTAH 84124
(801) 212-3571
(801) 212-3558 FAX

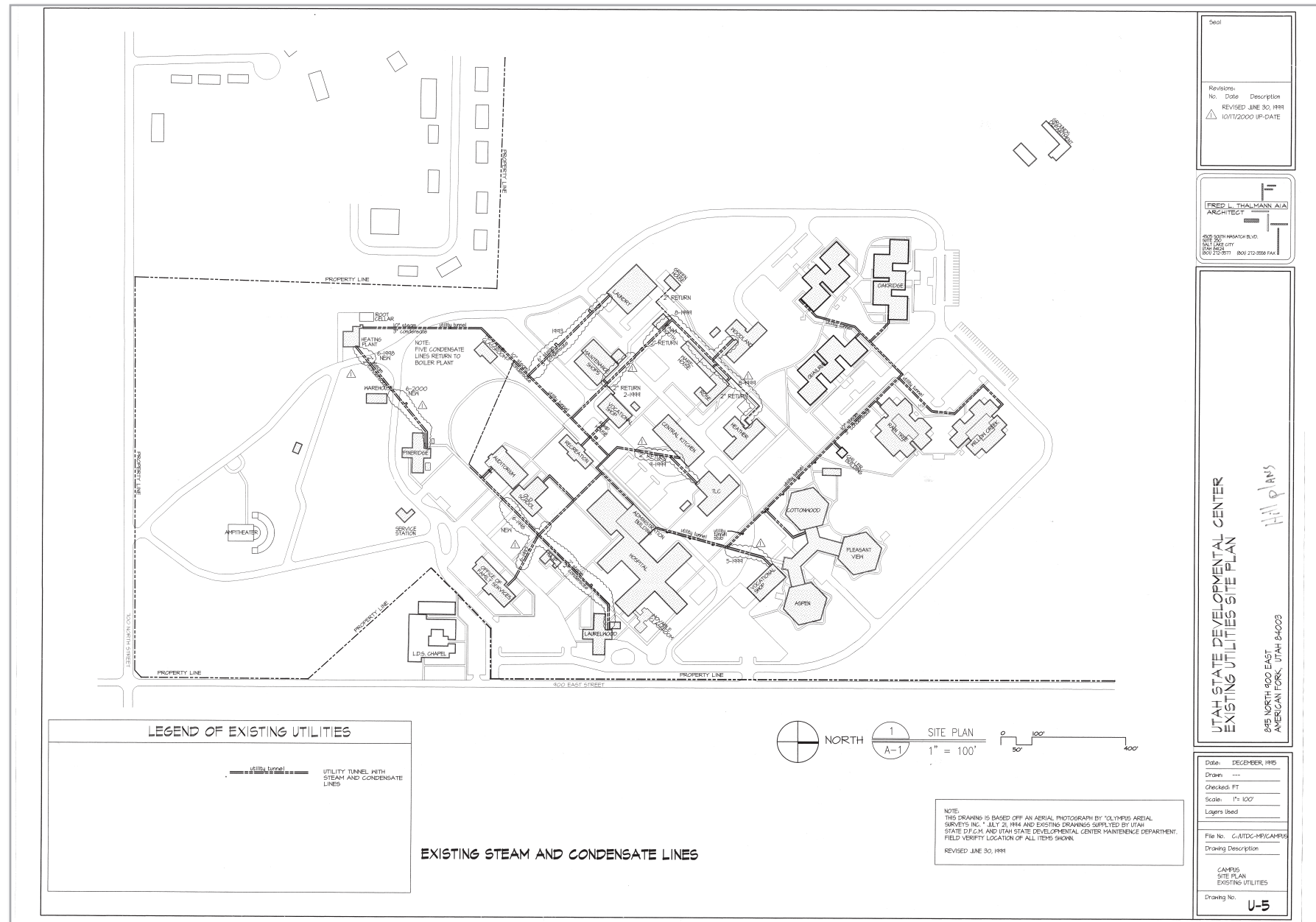
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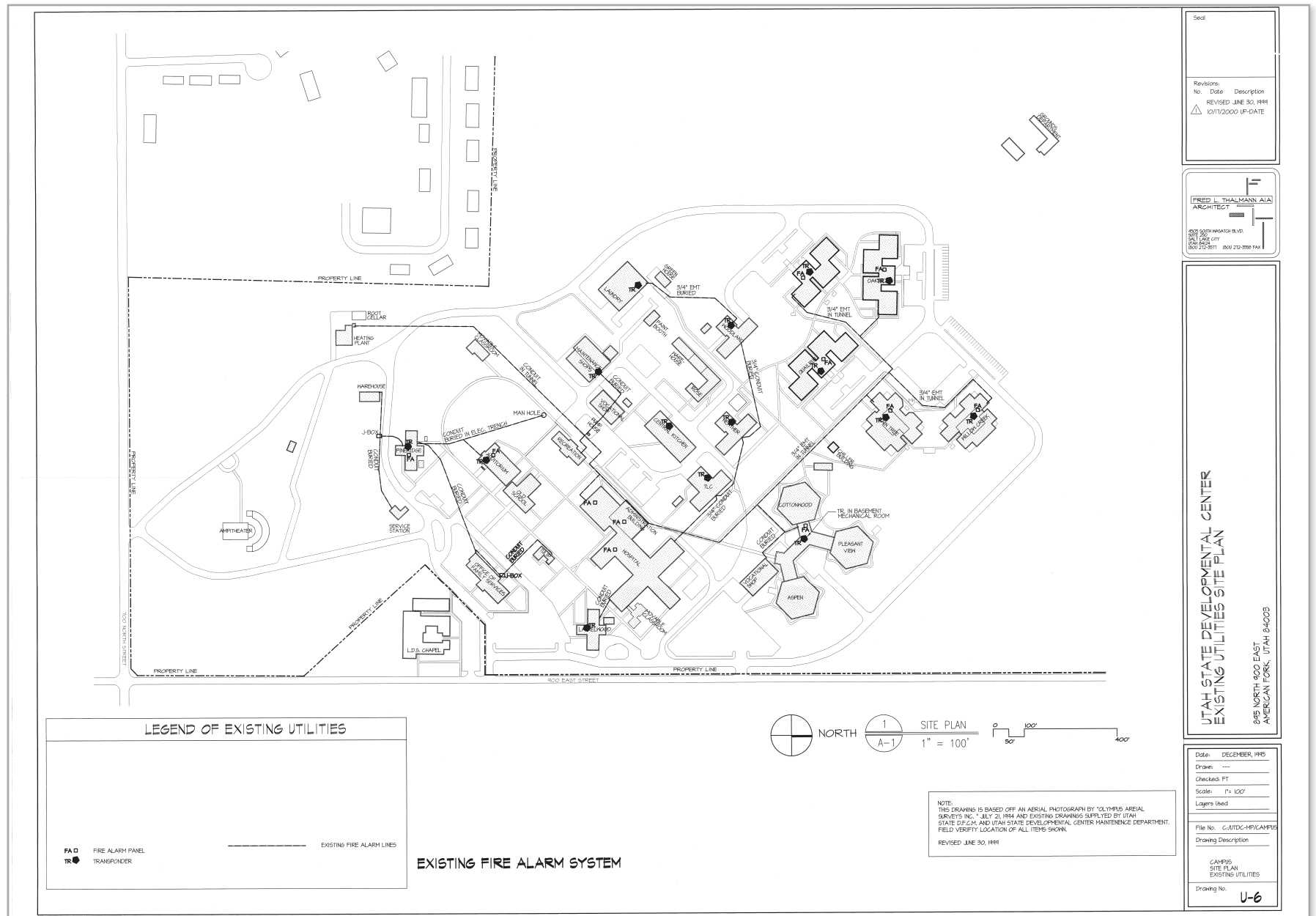


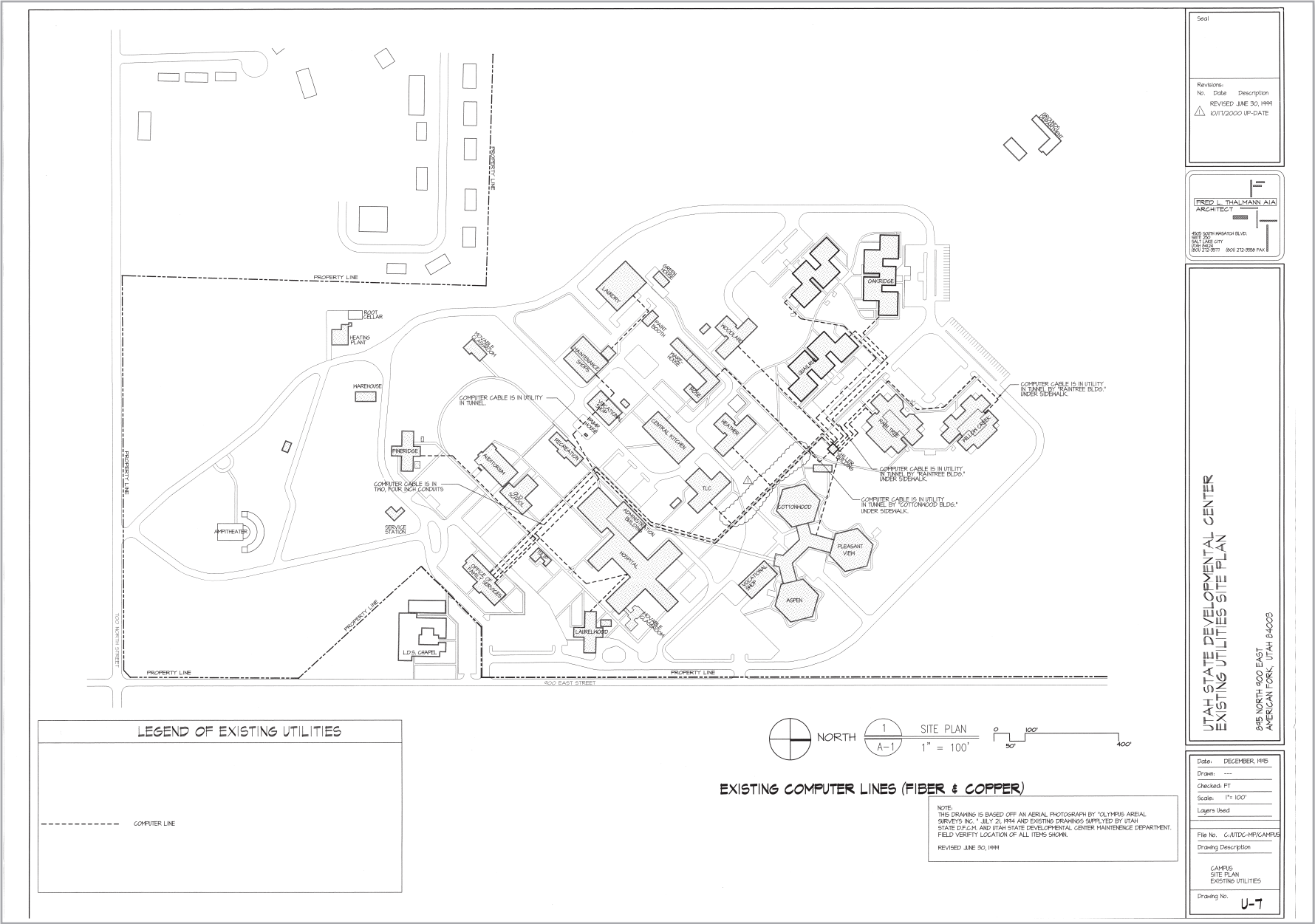


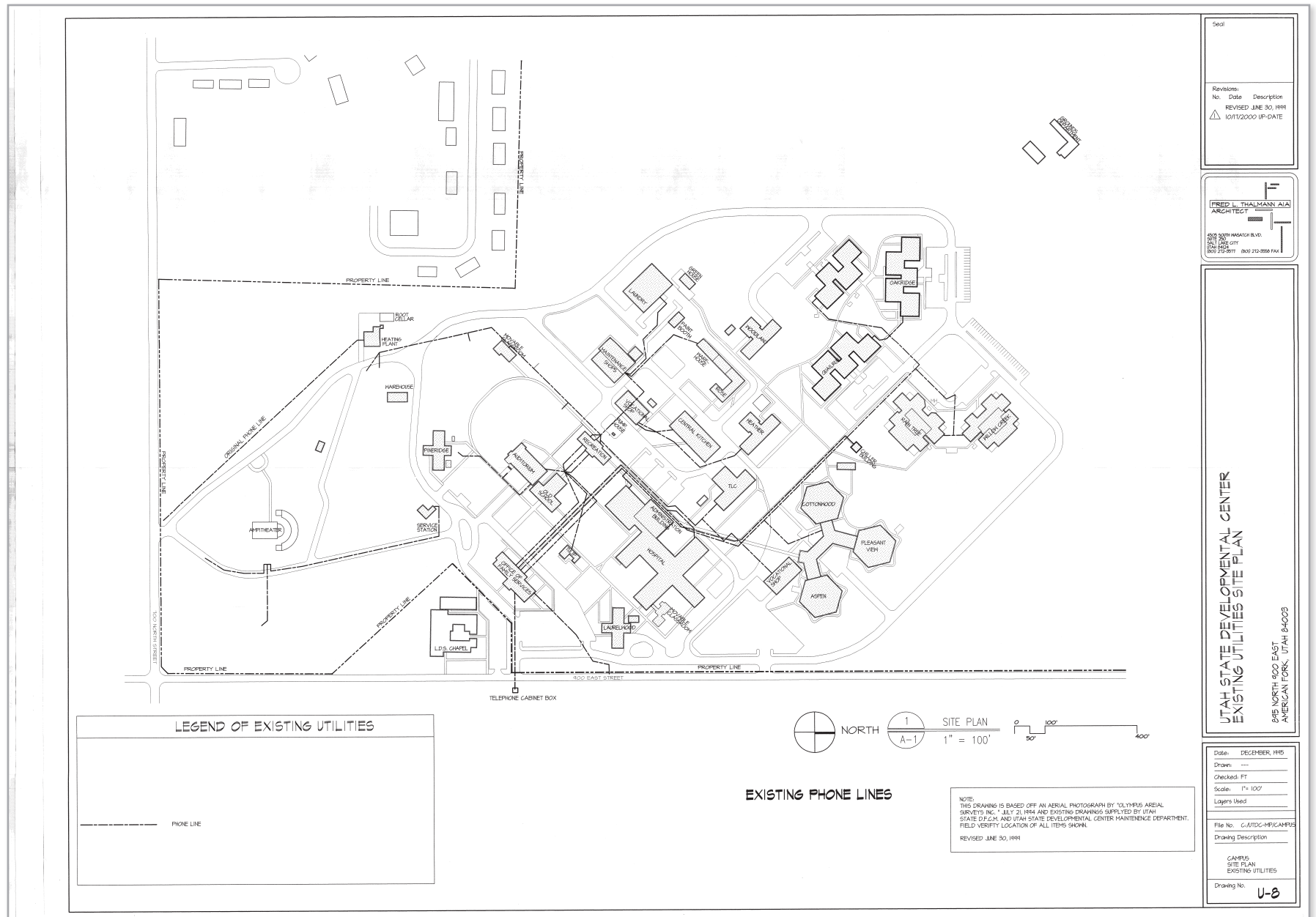


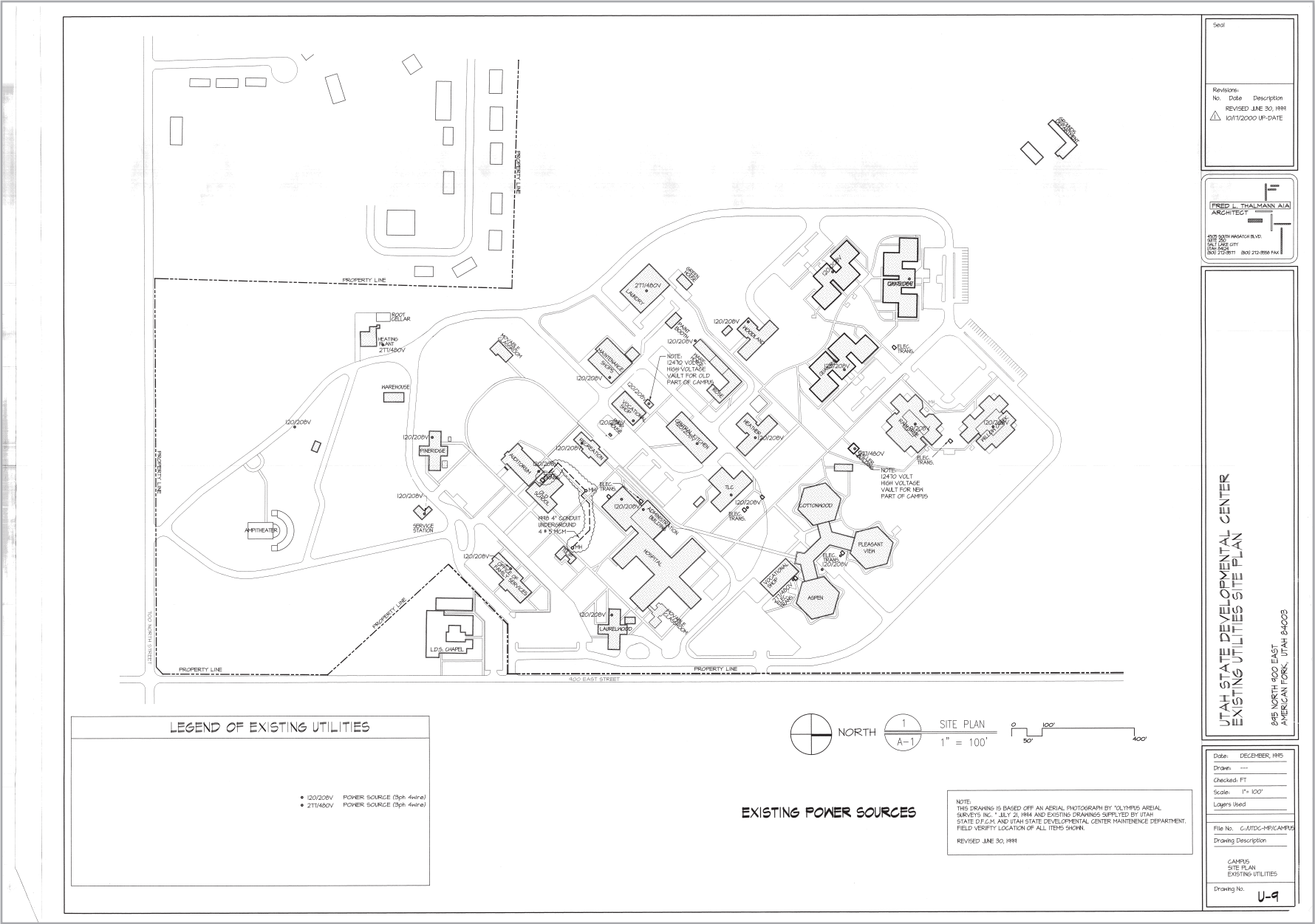


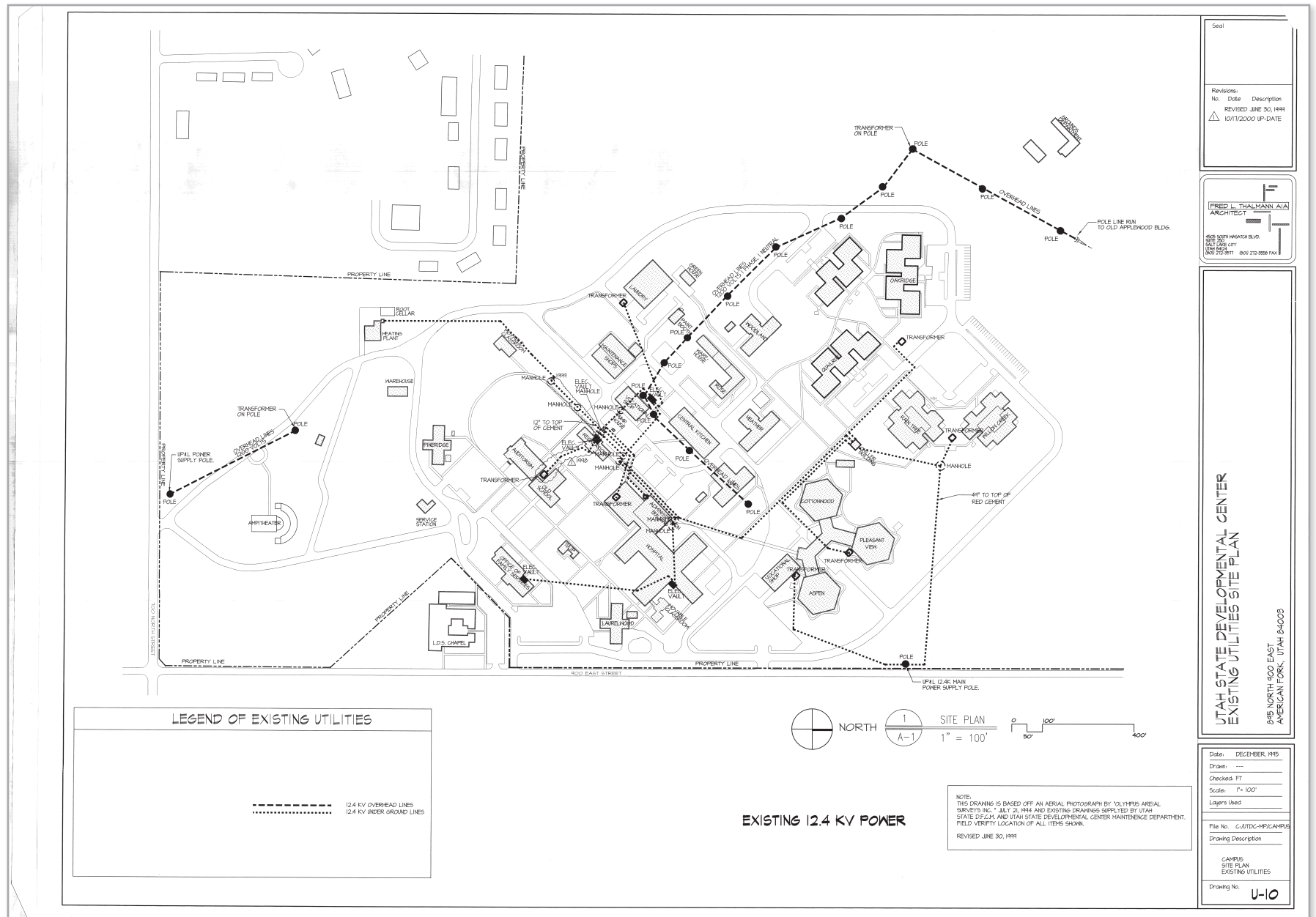


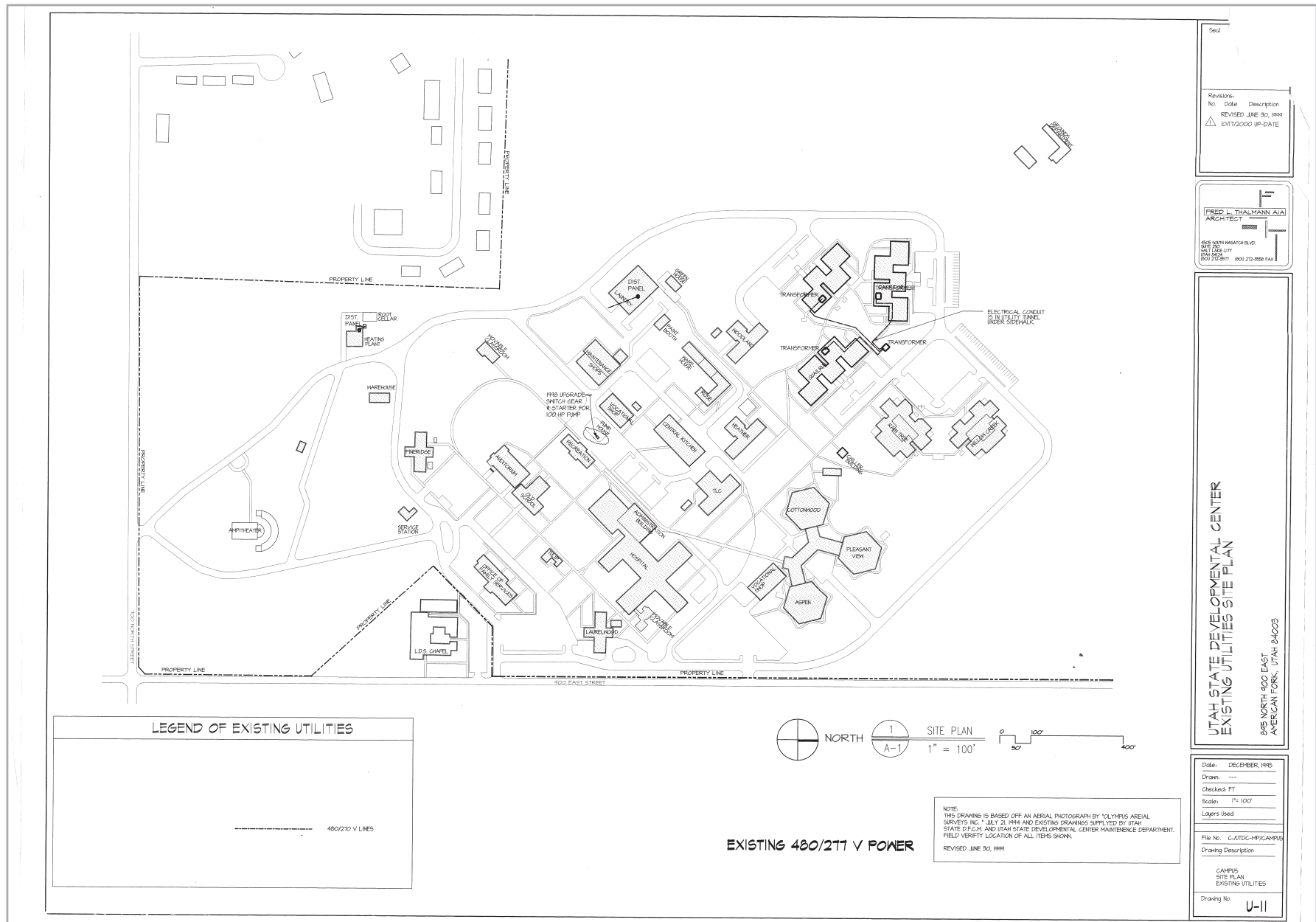


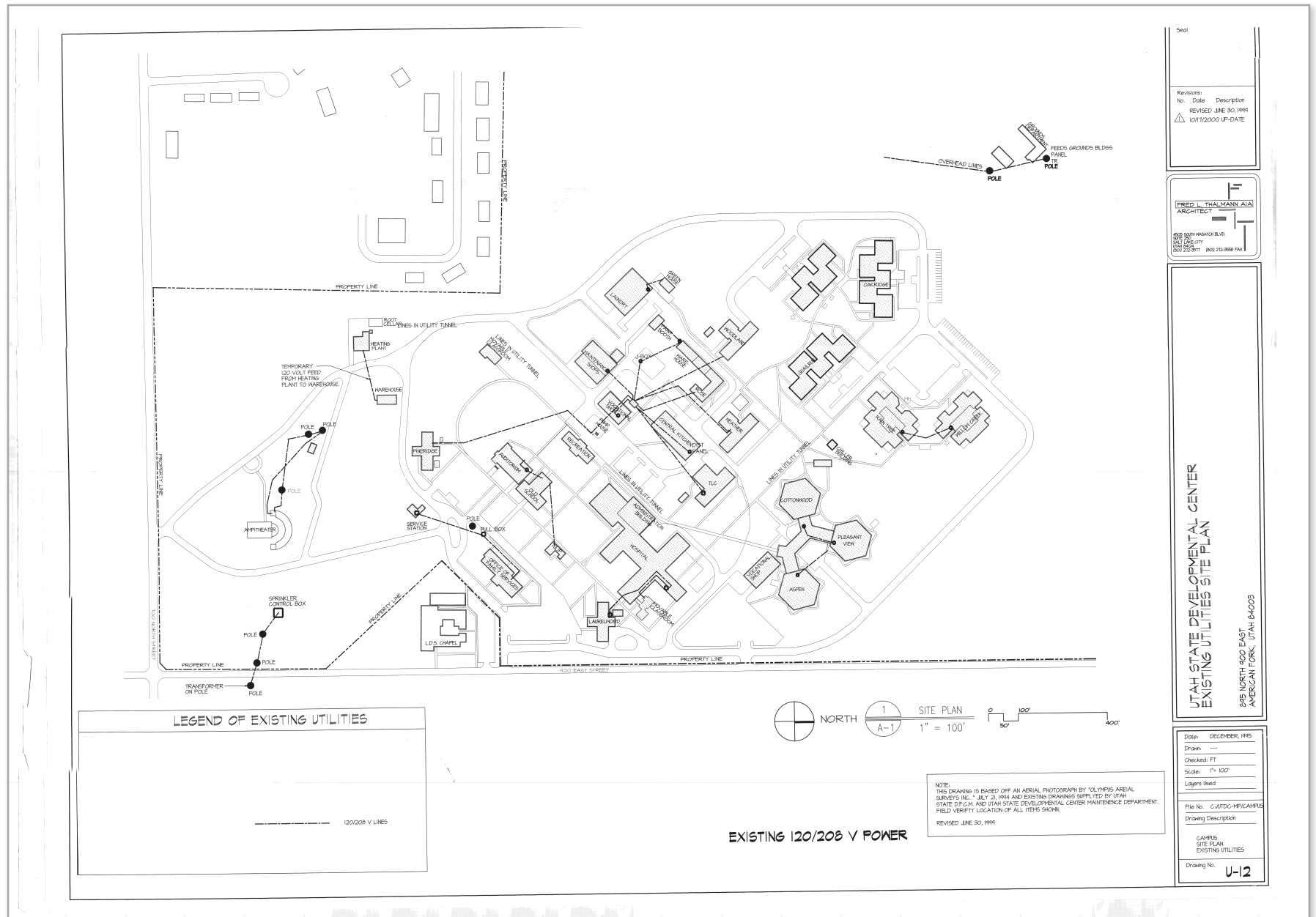


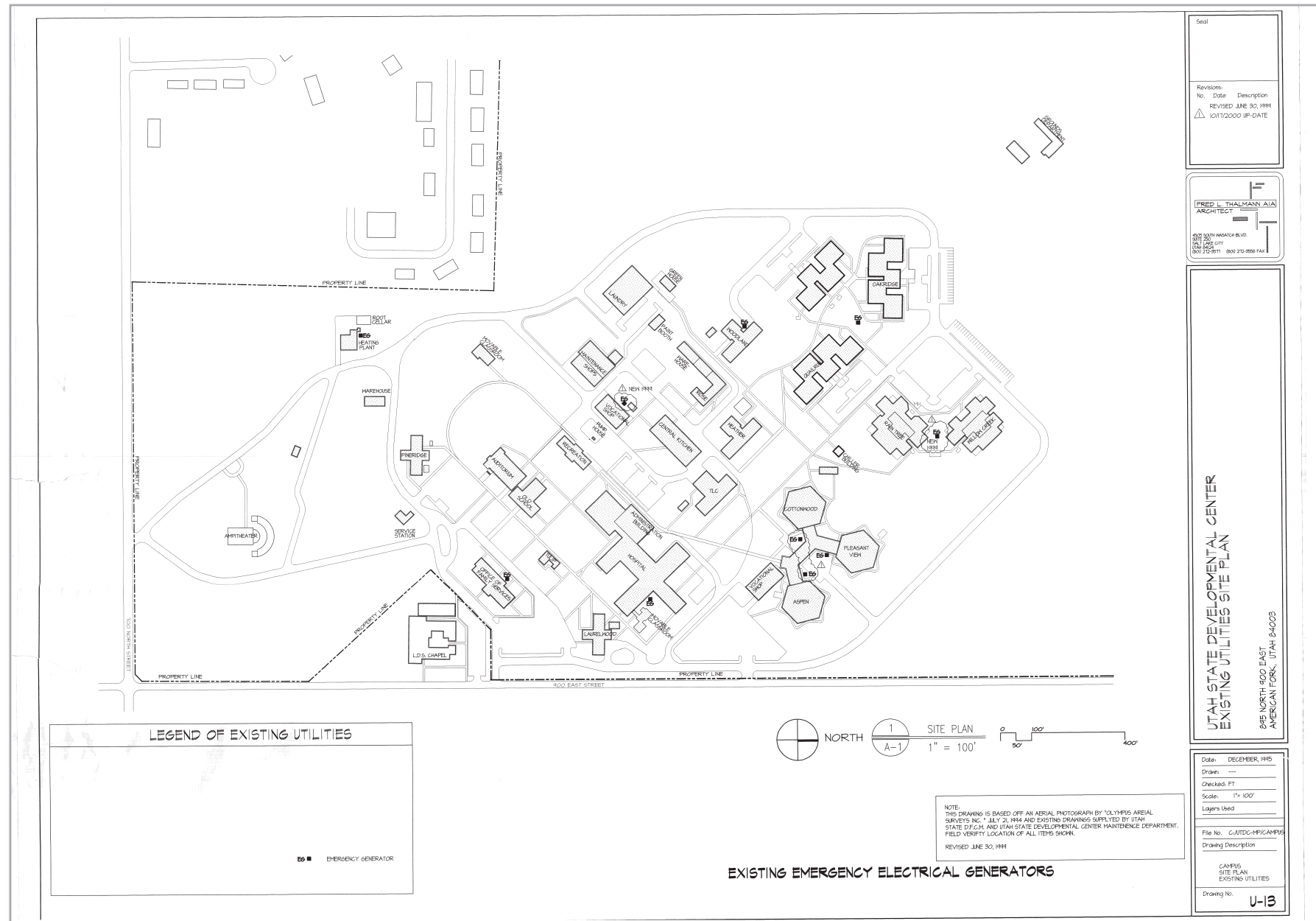


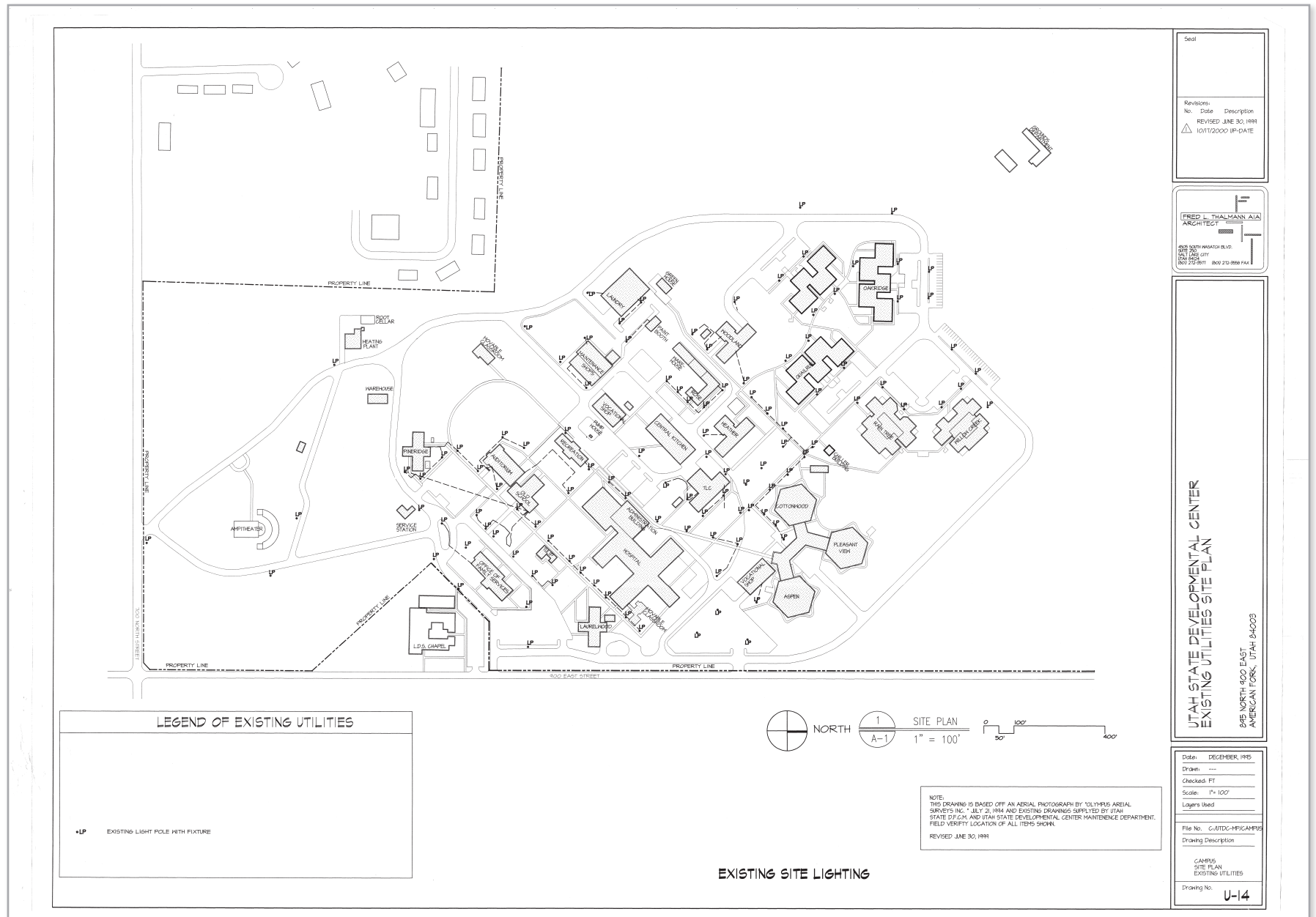


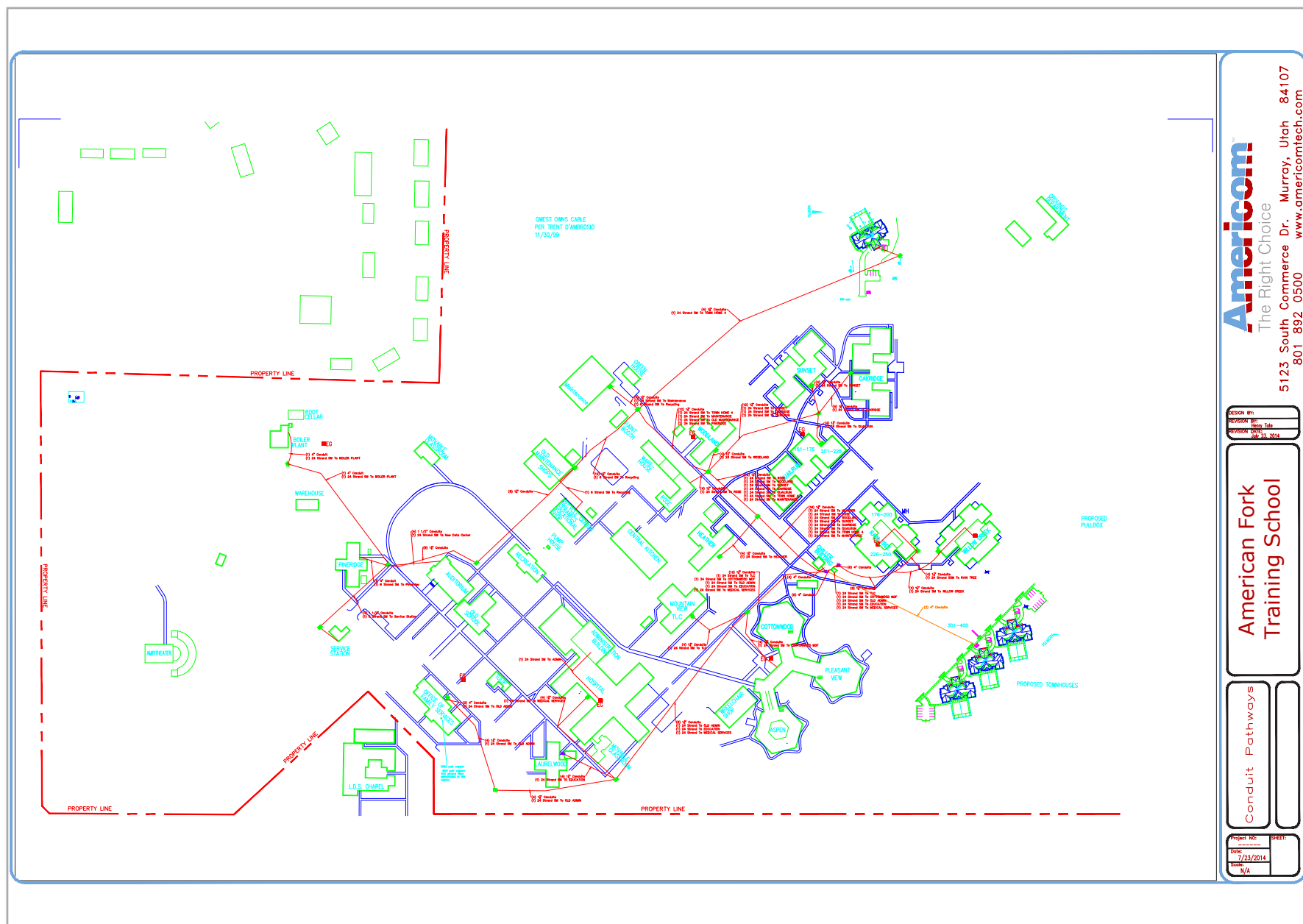














UTAH STATE DEVELOPMENTAL CENTER LONG RANGE MASTER PLAN

2. EXISTING CONDITIONS | B. PLANS

Building Functions

- | | |
|----------------------------|-----------|
| 1. Old Administration | (00647) |
| 2. Service Station | (00659) |
| 3. Service Station Storage | (03896) |
| 4. Pineridge Lodge | (00641) |
| 5. Car Wash Warehouse | (02034) |
| 6. New Heating Plant | (12965) |
| 7. Movable Classroom 18 | (00657) |
| 8. Movable Classroom 18 | (00658) |
| 9. Valentine Auditorium | (02037) |
| 10. Tulip Tree | (00633) |
| 11. Laurelwood/ Education | (00642) |
| 12. Movable Classroom 23 | (00655) |
| 13. Movable Classroom 23 | (00656) |
| 14. Evergreen/Cottage | (00640) |
| 15. Medical Services | (00651) |
| 16. Administration (EC) | (00660) |
| 17. Comp. Therapy | (00654) |
| 18. Recreation Building | (00624) |
| 19. New Pump house | (02035) |
| 20. Recycling Center | (00623) |
| 21. New Electrical Vault | (02045) |
| 22. Maintenance #1 | (00638) |
| 23. New Maintenance #2 | (00653) |
| 24. Plumbing Storage | (02073) |
| 25. Maintenance | (09204) |
| 26. Greenhouse | (04888) |
| 27. Paint Booth | (09947) |
| 28. Woodland Lodge | (00648) |
| 29. Rose Lodge | (00634) |
| 30. Rose Warehouse #2 | (00646) |
| 31. Rose Warehouse #3 | (02036) |
| 32. Storage/Warehouse | (00645) |
| 33. Heather Lodge/HR | (00649) |
| 34. Mountain View/TLC | (00650) |
| 35. Sunset Lodge | (02039) |
| 36. Quailrun Lodge | (02043) |
| 37. Chiller | |
| 38. Cottonwood Lodge | (02046) |
| 39. Pleasant View Lodge | (03266) |
| 40. Aspen Lodge | (03267) |
| 41. Aspen Hallway | (03267) |
| 42. Twin Home #4 | (14047) |
| 43. Oakridge Lodge | (02042) |
| 44. Raintree Lodge | (02044) |
| 45. Willowcreek Lodge | (02040) |
| 46. Twin Home #3 | (14046) |
| 47. Twin Home #2 | (14045) |
| 48. Twin Home #1 | (14044) |
| 49. Farm Buildings | (various) |

05.09.2011 . MHTN | 2.7



**REPORT
GEOTECHNICAL STUDY
PROPOSED DURABLE HOUSING
APPROXIMATELY 800 EAST 900 NORTH
AMERICAN FORK, UTAH
(40.3948° NORTH: 111.7773° WEST)**

Submitted To:

State of Utah, DFCM
4110 State Office Building
Salt Lake City, Utah

Submitted By:

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

July 22, 2014

Job No. 0128-098-14



July 22, 2014
Job No. 0128-098-14

Mr. Lucas Davis
State of Utah, DFCM
4110 State Office Building
Salt Lake City, Utah

Mr. Davis:

Re: Report
Geotechnical Study
Proposed Durable Housing
Approximately 800 East 900 North
American Fork, Utah
(40.3948° North: 111.7773° West)

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed Durable Housing project located at approximately 800 East 900 North in American Fork, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 1994, 1998, and 1999 is presented on Figure 1, Vicinity Map. A more detailed layout of the existing site and surrounding facilities is presented on Figure 2, Site Plan. The locations of the borings drilled in conjunction with this study are also presented on Figure 2.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions between Mr. Lucas Davis, State of the Utah – Division of Facilities Construction Management (DFCM) and Mr. Alan Spilker of GSH Geotechnical, Inc. (GSH).

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123
Tel: (801) 685-9190
www.gshgeo.com

GSH Geotechnical, Inc.
1596 West 2650 South, Suite 107
Ogden, Utah 84401
Tel: (801) 393-2012
www.gshgeo.com



The Utah DFCM
Job No. 0128-098-14
Geotechnical Study
July 22, 2014



2. Provide appropriate foundation, earthwork, pavement recommendations, and geoseismic information to be utilized in the design and construction of the proposed structure.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the drilling, logging, and sampling of 9 borings.
2. A laboratory testing program.
3. An office program consisting of the correlation of available data, engineering analyses, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by DFCM Purchase order No. 116025.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

The proposed building is to be approximately 35,000 square feet constructed at the southwest corner of the Utah State Development Center. The structure is anticipated to be 2 to 3 stories in height, established slab on grade.

Anticipated loads are in the range of 6 to 7 kips per lineal foot for continuous walls and maximum column loads on the order of 200 kips.

Site development will require a moderate amount of earthwork in the form of surface site grading. We estimate that maximum cuts and fills to achieve design surface grades will be on the order of 2 to 3 feet.

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Pavements associated with the proposed building consist of light vehicle parking. Projected traffic will consist of a light to moderate volume of automobiles and light trucks and occasional medium- and heavy-weight trucks.

3. SITE INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions at the site, 9 borings were extended to depths ranging from 5 to 23 feet below existing grade. The borings were drilled using a truck-mounted drill rig equipped with hollow-stem augers. Locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3I, Boring Logs. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log.

A 3.25-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) and a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) were utilized at select locations and depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture and density, partial gradation, consolidation, and chemical tests. The following paragraphs describe the tests and summarize the test data.

3.2.2 Moisture and Density Tests

To aid in classifying the soils and to help correlate other test data, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring logs, Figures 3A through 3I.

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3.2.3 Partial Gradation Tests

To aid in classifying the granular soils, partial gradation tests were performed. Results of the tests are tabulated below:

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve	Moisture Content Percent	Soil Classification
B-1	6.5	49.2	15.9	SM-ML
B-2	8.0	38.6	13.6	GM
B-4	5.5	6.3	5.8	GP-GM
B-4	9.5	63.2	18.4	ML-SM
B-8	7.0	67.2	19.4	ML-SM

3.2.4 Consolidation Tests

To provide data necessary for our settlement analyses, a consolidation test was performed on a representative sample of the natural fine-grained clay soils encountered. Test results indicate that the natural clayey soils are moderately over-consolidated and, when loaded below the over-consolidation pressure, will exhibit moderate compressibility characteristics. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

3.2.5 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the near-surface soils. The results of the chemical tests have not yet been completed. Test results will be provided in follow-up correspondence.

4. SITE CONDITIONS

4.1 SURFACE

The site is located at the southwest corner of the Utah State Development Center Campus and is presently a lawn-covered landscaped area with some trees along the perimeter of the property. The site slopes gently to the southwest and down to 800 East Street.

4.2 SUBSURFACE SOIL AND GROUNDWATER

With the exception of Borings B-3, B-6, and B-7, the surface is blanketed with fills comprised primarily of clayey gravels with some sand and silty clay with some gravel, as well as occasional

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silty sands. These fills encountered extended to depth of 5.5 to 7.5 feet and unless in place density data is available to prove otherwise, must be considered as non-engineered.

From the surface at Borings B-3, B-6, and B-7, natural silty clay with trace to some gravel was encountered extending to a depth of 3.5 feet at Boring B-6 and the full depth penetrated, 5 feet, at Borings B-3 and B-7. This clay is stiff, moist, brown, and moderately over-consolidated. The top 4 inches at each boring contain major roots and are considered topsoil.

Below the surficial non-engineered fills and natural clay soils, natural sands and gravels with varying silt content were encountered to the maximum depth penetrated, 23 feet. These natural sands and gravels are loose grading dense, moist, brown and light brown in color, and will exhibit moderately high strength and low compressibility characteristics.

Groundwater was not encountered within the depths penetrated, 5 to 23 feet.

For a more detailed description, please refer to Figures 3A through 3I, Log of Borings.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The results of our study show that the proposed structures may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspects of the site are the non-engineered fills encountered to depths of 5.5 to 7.5 feet below the surface. Non-engineered fills must be removed below the building and exterior rigid pavements. The non-engineered fills may remain below flexible pavements if properly prepared, as outlined later in this report.

The majority of the non-engineered fills encountered are comprised of predominately granular soils. These granular fills may be re-utilized as structural site grading fills if they meet the requirements for such as outlined later in this report. The on-site fine-grained soils are not recommended for structural site grading fills.

Detailed discussions pertaining to earthwork, foundations, floor slabs, lateral resistance, pavements, and the geoseismic setting of the site are discussed in the following sections.

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5.2 EARTHWORK

5.2.1 Site Preparation

Initial site preparation will consist of the stripping and removal of all surface vegetation, topsoil, any other deleterious materials, non-engineered fills, and loose/disturbed soils extending at least 5 feet beyond the perimeter of the proposed building and 2 feet beyond rigid pavements.

Similarly, remove all surface vegetation, topsoil, and any other deleterious materials from below flexible pavements. Non-engineered fills may remain below flexible pavement if free of debris and the upper 12 inches are scarified, moisture conditioned, and re-compacted to the requirements for structural fill.

All stripped vegetation shall be removed from the site. Stripped topsoil will be unsuitable for structural fill but may be stockpiled for subsequent landscaping purposes.

Prior to the placement of structural site grading fill, pavements, floor slabs, or footings, the exposed subgrade must be proofrolled by running moderate-weight rubber tire-mounted construction equipment uniformly over the surface at least 2 times. If excessively soft or otherwise unsuitable soils are encountered beneath footings, they must be completely removed. If removal depth required is greater than 2 feet, GSH must be notified to provide further recommendations. In pavement, floor slab, and outside flatwork areas, unsuitable natural soils should be removed to a maximum depth of 2 feet and replaced with compacted granular structural fill. Non-engineered fills shall be handled as previously stated.

5.2.2 Temporary Excavations

The soils encountered primarily consist of clayey gravel fills and fine-grained clay soils overlying granular soils (sands and gravels).

Temporary construction excavations in cohesive soil, not exceeding 4 feet in depth and above or below the groundwater table, may be constructed with near-vertical sideslopes. Temporary excavations up to 8 feet deep in cohesive or granular soils, above or below the water table, may be constructed with sideslopes no steeper than one horizontal to one vertical. Excavations deeper than 8 feet are not anticipated at the site.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

To minimize disturbance to the underlying soils, it is our recommendation that foundations be excavated with a backhoe equipped with a smooth lip bucket.

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5.2.3 Structural Fill

Structural fill will be required as final site grading fill, as backfill over foundations and utilities, and as potential replacement fill beneath foundations or stabilization fill. All structural fill must be free of sod, rubbish, construction debris, frozen soil, and other deleterious materials.

Structural site grading fill is defined as fill placed over fairly large open areas to raise the overall site grade. The maximum particle size within structural site grading fill should generally not exceed 4 inches; although, occasional particles up to 6 to 8 inches may be incorporated provided that they do not result in "honeycombing" or preclude the obtainment of the desired degree of compaction. In confined areas, the maximum particle size should generally be restricted to 2.5 inches. **Existing granular soils and non-engineered fills may be re-utilized as structural site grading fill provided they meet the requirements stated herein.**

Import structural replacement fill below foundations and floor slabs shall consist of a well graded sand and gravel mixture with less than 30 percent retained on the 0.75-inch sieve and less than 20 percent passing the No. 200 Sieve (clays and silts).

Where stabilization of soft, saturated subgrade is required, a mixture of clean angular gravels and cobbles should be used. Recommendations may be provided upon request.

Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

Structural fill (other than stabilizing fill) shall be placed in lifts not exceeding 8 inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the AASHTO¹ T-180 (ASTM² D-1557) compaction criteria in accordance with the table on the following page.

¹ American Association of State Highway and Transportation Officials
² American Society for Testing and Materials

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Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond building edge and 2 feet beyond the edge of pavements	0 to 10	95
Outside area defined above	0 to 5	90
Outside area defined above	5 to 10	95
Aggregate Base	--	96

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade shall be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation should consist of the removal of all loose or disturbed soils.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (flatwork, floor slabs, roads, etc.) should be placed at the same density requirements established for structural fill. Most utility companies and City-County governments are now requiring that Type A-1a or A-1b (AASHTO Designation – basically granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways, the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

Fine-grained cohesive soils, such as clays and silts, are not recommended for use as trench backfill.

5.2.6 Design Data

The proposed structure may be supported upon conventional spread and continuous wall foundations established upon suitable undisturbed natural soils and/or structural fill extending to suitable natural soils. GSH anticipates that under the majority of the proposed building, non-engineered fills will need to be removed to an approximate depth of 5.5 to 7.5 feet below the

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existing surface. If the structure is to be placed slab on grade, fill soils will be required under the structure and will likely be greater than 24 inches underneath footings. For design, the following parameters are provided with respect to the projected loading discussed in Section 2, Proposed Construction of this report:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Recommended Net Bearing Pressure for Real Load Conditions	- 2,500 pounds per square foot
Recommended Net Bearing Pressure for Real Load Conditions for footings placed on a minimum Of 24 inches of granular structural fill.	- 3,000 pounds per square foot
Bearing Pressure Increase for Seismic Loading	- 50 percent

The term “net bearing pressure” refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.2.7 Installation

Under no circumstances should the footings be installed upon loose or disturbed soil, rubbish, construction debris or other deleterious materials, frozen soil, or ponded water. GSH must observe the foundation soils to determine if suitable natural soils have been encountered at the base of the footing. If unsuitable soils are encountered, they must be removed and replaced with granular structural fill. If granular soils (import fills or natural) on which the footings are to be established become loose or disturbed, they must be recompacted to the requirements for structural fill before the footings are poured.

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The width of structural replacement fill, as required below footings, should be equal to the footing plus one foot for each foot of fill thickness.

5.2.8 Settlements

Footings design and installed in accordance with the above recommendations and supporting the projected maximum anticipated loads are anticipated to experience maximum settlements of less than one inch.

Approximately 60 percent of the quoted settlement should occur during construction.

5.3 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of 0.40 should be utilized. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.4 AT-GRADE SLABS

Floor slabs may be established upon properly prepared, suitable undisturbed natural soils and/or upon structural fill extending to suitable natural soils. **Floor slabs may not be placed overlying the existing non-engineered fills, even if they are properly prepared.** If placed over native soils, they must be prepared as described in Section 5.2.1, Site Preparation. Additionally, to provide uniform support and improve slab curing, it is recommended that floor slabs be directly underlain by at least 4 inches of "free-draining" fill, such as "pea" gravel or three-quarters- to one-inch-minus clean gap-graded gravel. Settlements of lightly to moderately loaded floor slabs are anticipated to be minor.

At-grade slabs consisting of sidewalks and other related flatwork should be underlain by a 4-inch minimum road base leveling course over the prepared subgrade.

5.5 PAVEMENTS

The existing natural clay and non-engineered fills will exhibit poor to moderate pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed (see Section 5.2.1, Site Preparation). With the subgrade soils and the projected traffic

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as discussed in Section 2, Proposed Construction, the following pavement sections are recommended.

Projected traffic will consist of a light to moderate volume of automobiles and light trucks, a light volume of medium-weight trucks, and occasional heavy-weight trucks. Medium- and heavy-weight truck traffic is expected to be primarily around the drop off/delivery loop.

Parking Areas

(Light Volume of Automobiles and Light Trucks,
Occasional Medium-Weight Trucks,
No Heavy-Weight Trucks)
[5 equivalent 18-kip axle loads per day]

Flexible:

2.5 inches	Asphalt concrete
8.0 inches	Aggregate base course
Over	Properly prepared non-engineered fills, properly prepared natural subgrade soils, and/or structural site grading fill extending to properly prepared subgrade soils

Rigid*:

5.0 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base course
Over	Properly prepared <u>natural</u> subgrade soils and/or structural site grading fill extending to suitable natural subgrade soils

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Primary Drive Lanes

(Light to Moderate Volume of Automobiles and Light Trucks,
Light Volume of Medium-Weight Trucks,
and Occasional Heavy-Weight Trucks)
[10 equivalent 18-kip axle loads per day]

Flexible:

3.0 inches	Asphalt concrete
8.0 inches	Aggregate base course
Over	Properly prepared non-engineered fills, properly prepared subgrade soils and/or structural site grading fill extending to properly prepared subgrade soils

Rigid*:

6 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base course
Over	Properly prepared natural subgrade soils and/or structural site grading fill extending to suitable natural subgrade soils

* Rigid pavements must not be placed over non-engineered fills.

For dumpster pads, we recommend a pavement section consisting of 6.5 inches of Portland cement concrete, 6.0 inches of aggregate base course, over properly prepared suitable natural subgrade or site grading structural fills extending to suitable natural soils.

These above rigid pavement sections are for non-reinforced Portland cement concrete. Concrete should be designed in accordance with the American Concrete Institute (ACI) and joint details should conform to the Portland Cement Association (PCA) guidelines. The concrete should have a minimum 28-day unconfined compressive strength of 4,000 pounds per square inch and contain 6 percent ± 1 percent air-entrainment.

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5.6 CEMENT TYPE

Cement type recommendation will be provided within a memorandum to follow.

5.7 GEOSEISMIC SETTING

5.7.1 General

Utah municipalities have adopted the International Building Code (IBC) 2012. The IBC 2012 code determines the seismic hazard for a site based upon 2008 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

The structure must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2012 edition.

5.7.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site. The nearest mapped active fault is the Wasatch Fault, approximately 1.8 miles to the east.

5.7.3 Soil Class

For dynamic structural analysis, the Site Class D - Stiff Soil Profile as defined in Chapter 20 of ASCE 7 (per Section 1613.3.2, Site Class Definitions, of IBC 2012) can be utilized.

5.7.4 Ground Motions

The IBC 2012 code is based on 2008 USGS mapping, which provides values of short and long period accelerations for the Site Class B boundary for the Maximum Considered Earthquake (MCE). This Site Class B boundary represents average bedrock values for the Western United States and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for the MCE event and incorporates the appropriate soil amplification factor for a Site Class D soil profile. Based on the site latitude and longitude (40.3948 degrees north and 111.7773 degrees west, respectively), the values for this site are tabulated on the following page.



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Spectral Acceleration Value, T	Site Class B Boundary [mapped values] (% g)	Site Coefficient	Site Class D [adjusted for site class effects] (% g)	Design Values (% g)
Peak Ground Acceleration	48.0	$F_a = 1.020$	48.9	32.6
0.2 Seconds (Short Period Acceleration)	$S_s = 119.9$	$F_a = 1.020$	$S_{MS} = 122.3$	$S_{DS} = 81.5$
1.0 Second (Long Period Acceleration)	$S_1 = 42.8$	$F_v = 1.572$	$S_{M1} = 67.3$	$S_{D1} = 44.9$

5.7.5 Liquefaction

The site is located within a mapped "low" liquefaction zone. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event. Clayey soils, even if saturated, will not liquefy during a major seismic event.

The soils encountered to the full depths penetrated consist of non-liquefiable soils. Based on these soil conditions, the site soils are unlikely to liquefy under the design seismic event.

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 685-9190.

Respectfully submitted,

GSH Geotechnical, Inc.

Bryan N. Roberts
Bryan N. Roberts, P.E.
State of Utah No. 276476
Project Geotechnical Engineer



Reviewed by:

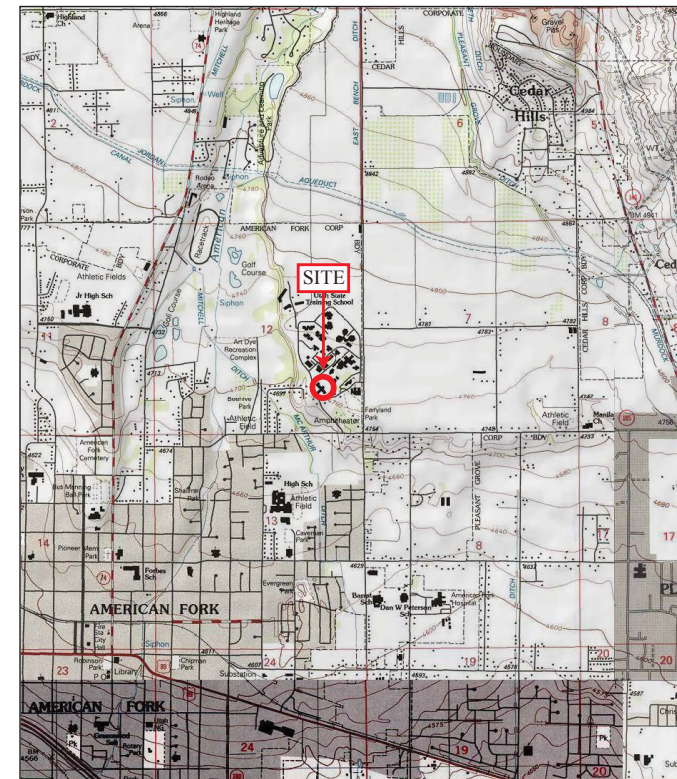
Alan D. Spilker
Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

BNR/ADS:jlh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3I, Boring Logs
Figure 4, Key to Boring Log (USCS)

Addressee (email)

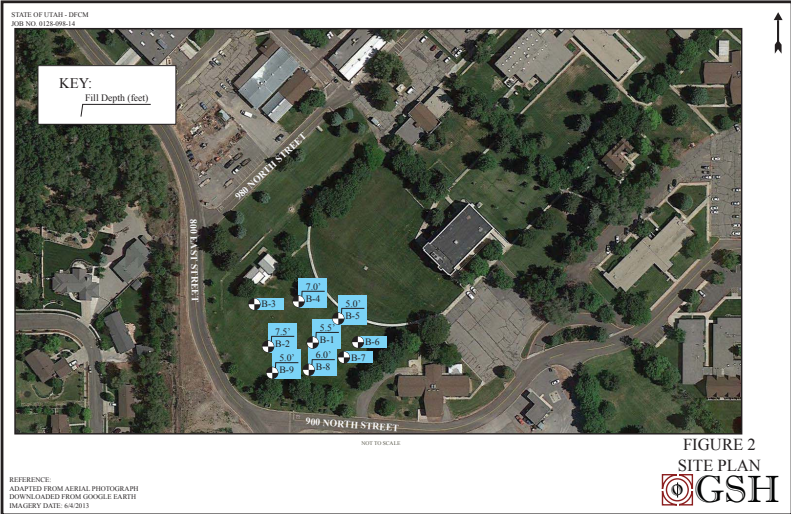
STATE OF UTAH - DFCM
JOB NO. 0128-098-14



SCALE IN FEET
1000 0 1000 2000

FIGURE 1
VICINITY MAP
 GSH

REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP(S)
ENTITLED "LEHI, UTAH" AND "OREM, UTAH," BOTH DATED 1994;
"TIMPANOGOS CAVE, UTAH" DATED 1998; "PELICAN POINT, UTAH"
DATED 1999

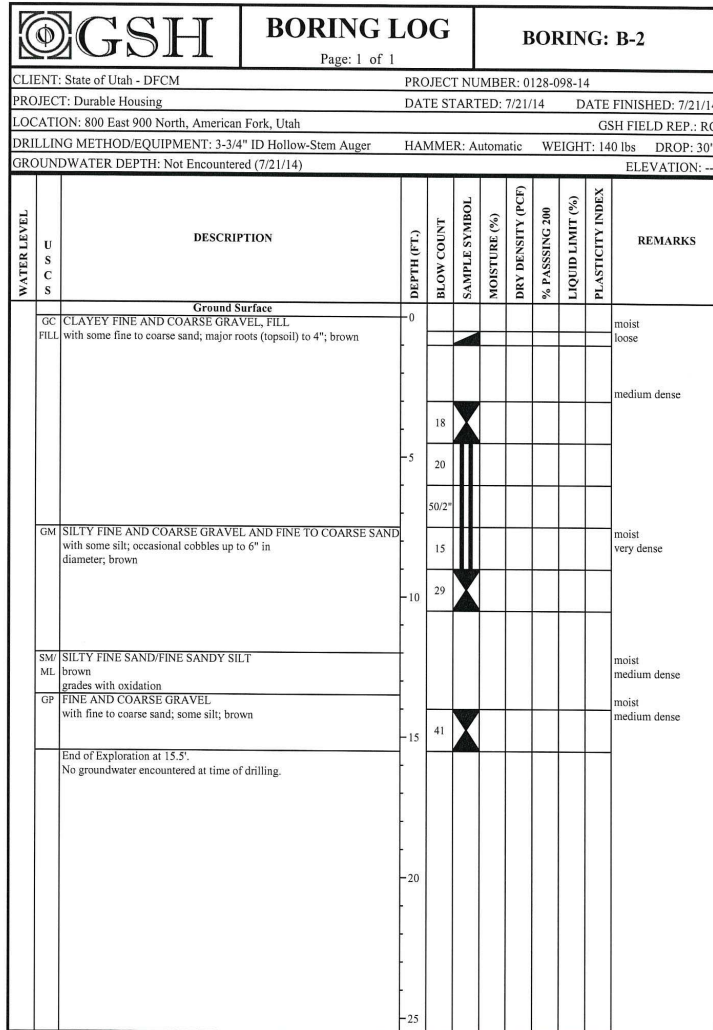


GSH		BORING LOG			BORING: B-1						
CLIENT: State of Utah - DFCM					PROJECT NUMBER: 0128-098-14						
PROJECT: Durable Housing					DATE STARTED: 7/21/14		DATE FINISHED: 7/21/14				
LOCATION: 800 East 900 North, American Fork, Utah					GSH FIELD REP.: RG						
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger					HAMMER: Automatic		WEIGHT: 140 lbs				
GROUNDWATER DEPTH: Not Encountered (7/21/14)					DROP: 30"		ELEVATION: ---				
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
		GC CLAYEY FINE AND COARSE GRAVEL, FILL									moist loose
		FILL with fine to coarse sand; major roots (topsoil) to 4"+; brown		29							
			5								
				21							
		SM/ ML SILTY FINE SAND/FINE SANDY SILT									moist loose
		brown with oxidation		10		15.9	49.2				
			10								
				9							
		GP/ SP FINE AND COARSE GRAVEL AND FINE TO COARSE SAND									moist dense
		with some silt; brown and gray		35							
			15								
			20								
				40							
		grades with occasional cobbles 4" in diameter									
				77							
		End of Exploration at 23.0'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 22.0'.									
			25								

See Subsurface Conditions section in the report for additional information.

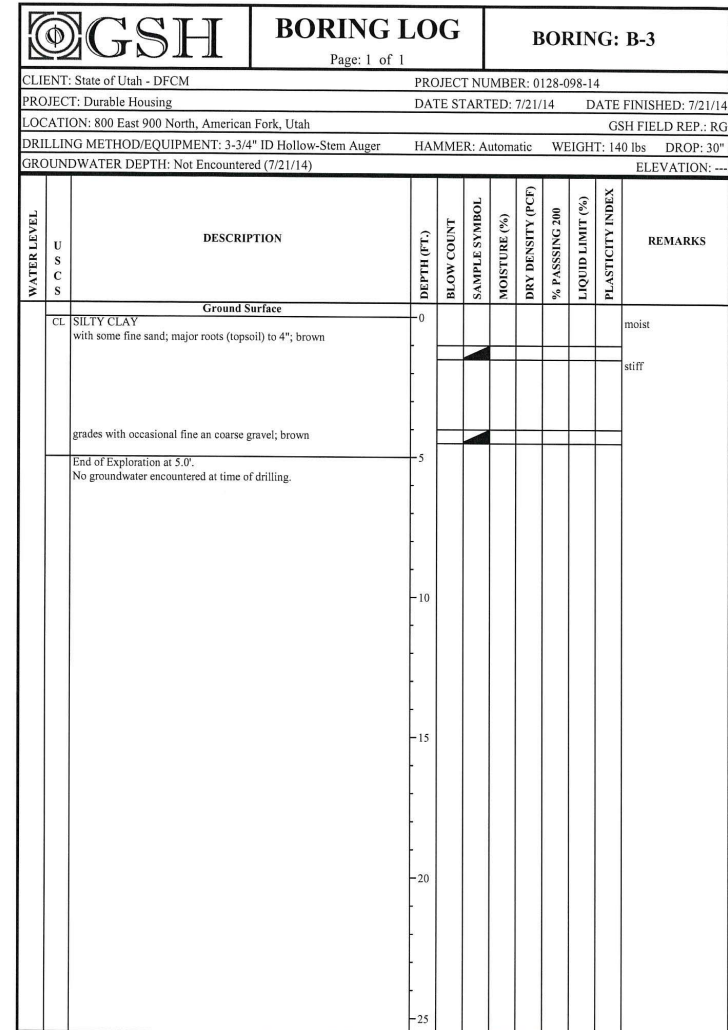
FIGURE 3A











See Subsurface Conditions section in the report for additional information.

FIGURE 3B




See Subsurface Conditions section in the report for additional information.

FIGURE 3C

 GSH		BORING LOG				BORING: B-4					
CLIENT: State of Utah - DFCM						PROJECT NUMBER: 0128-098-14					
PROJECT: Durable Housing						DATE STARTED: 7/21/14			DATE FINISHED: 7/21/14		
LOCATION: 800 East 900 North, American Fork, Utah						GSH FIELD REP: RC					
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger						HAMMER: Automatic		WEIGHT: 140 lbs		DROP: 30"	
GROUNDWATER DEPTH: Not Encountered (7/21/14)						ELEVATION: --					
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GC FILL	CLAYEY FINE AND COARSE GRAVEL, FILL with some fine to coarse sand; major roots (topsoil) to 4"; brown									moist loose
				11							medium dense
	GP/ GM FILL	FINE AND COARSE GRAVEL, FILL with some fine to coarse sand; some silt; gray	5	30							moist medium dense
	ML	FINE SANDY SILT/SILTY FINE SAND with occasional fine and coarse gravel; brown		25		18.4	63				moist loose
	SM	SILTY FINE SAND brown grades with occasional layers up to 2" thick of fine sandy silt; oxidation	10	15							moist loose
	GP	FINE AND COARSE GRAVEL with fine to coarse sand; some silt; gray		62							moist very dense
		End of Exploration at 15.5'. No groundwater encountered at time of drilling.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

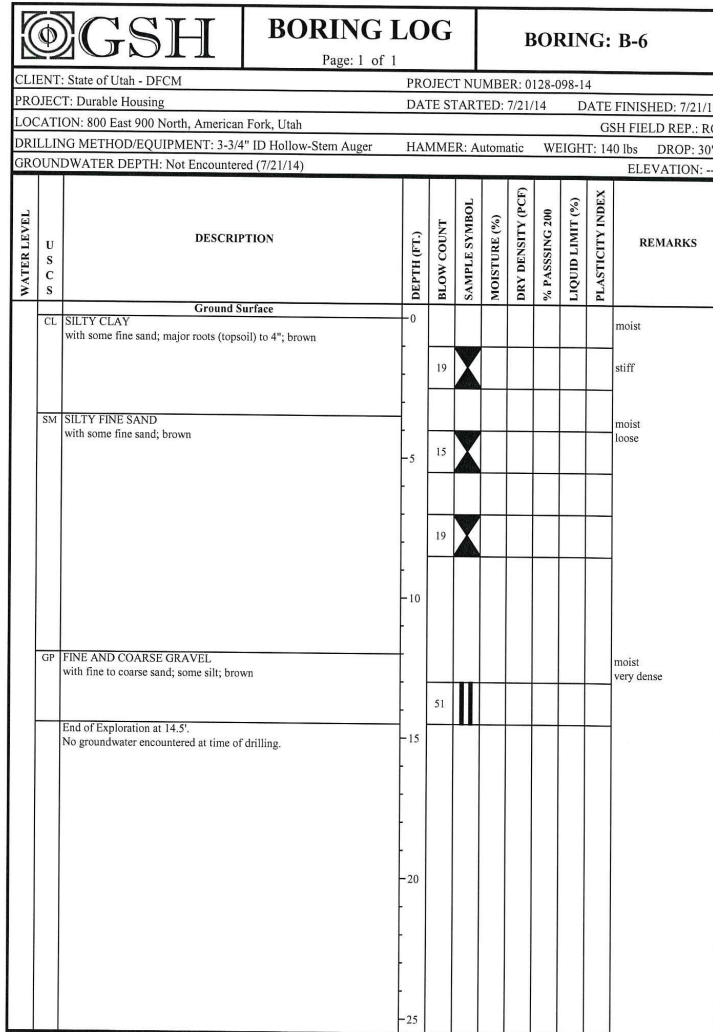
FIGURE 3D

 GSH		BORING LOG				BORING: B-5					
		Page: 1 of 1									
CLIENT: State of Utah - DFCM						PROJECT NUMBER: 0128-098-14					
PROJECT: Durable Housing						DATE STARTED: 7/21/14			DATE FINISHED: 7/21/14		
LOCATION: 800 East 900 North, American Fork, Utah						GSH FIELD REP.: RG					
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger						HAMMER: Automatic		WEIGHT: 140 lbs		DROP: 30"	
GROUNDWATER DEPTH: Not Encountered (7/21/14)						ELEVATION: ---					
WATER LEVEL U S S C	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS	
	Ground Surface	0									
CL FILL	SILTY CLAY, FILL with some fine sand and occasional fine and coarse gravel; major roots (topsoil) to 4"; brown									moist	
										stiff	
	End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5									
		10									
		15									
		20									
		25									

See Subsurface Conditions section in the report for additional information.

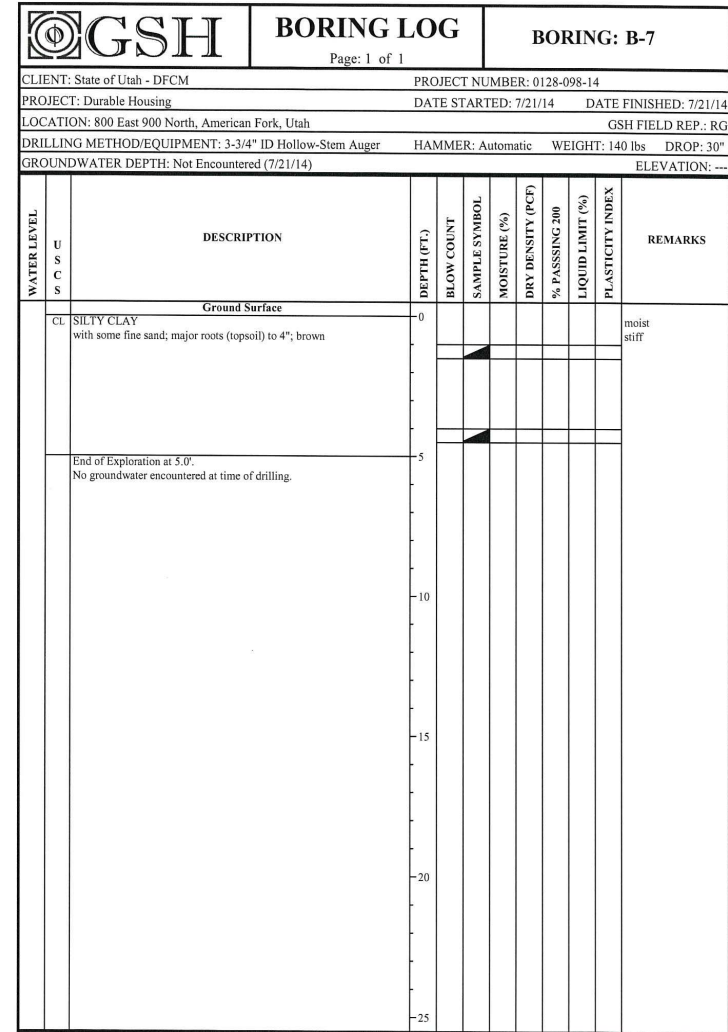
FIGURE 3E





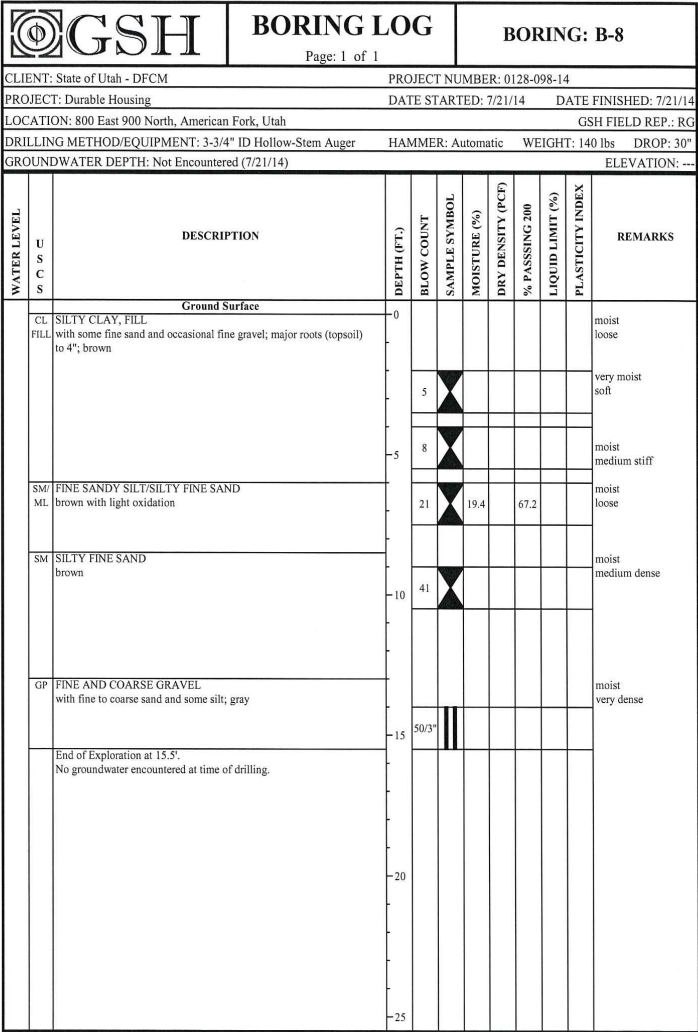
See Subsurface Conditions section in the report for additional information.

FIGURE 3F



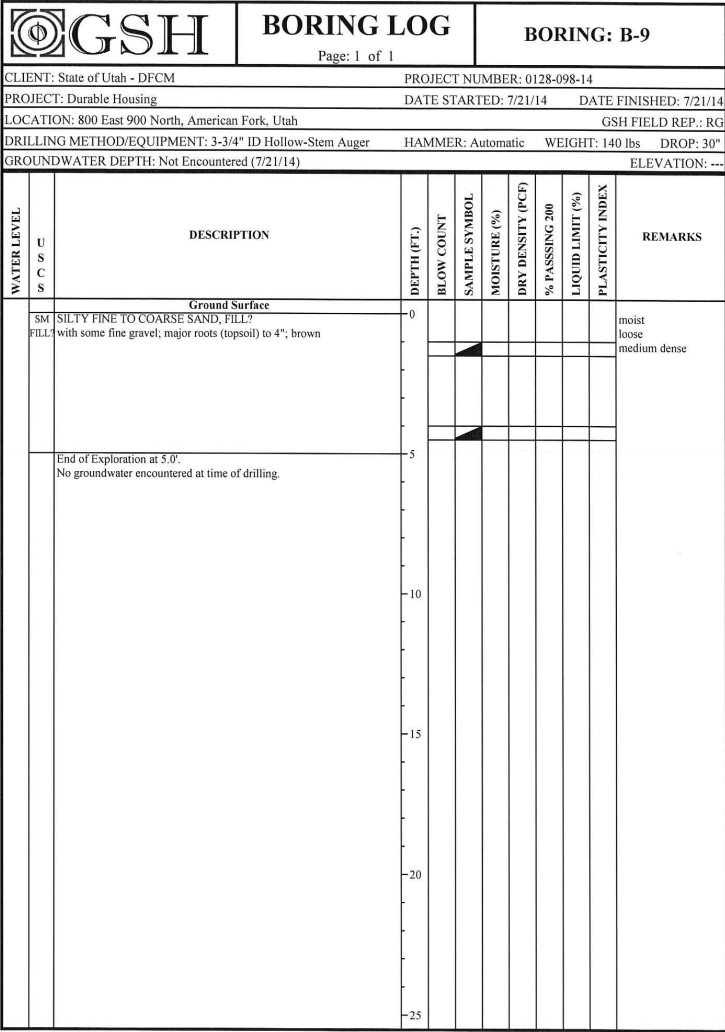
See Subsurface Conditions section in the report for additional information.

FIGURE 3G



See Subsurface Conditions section in the report for additional information.

FIGURE 3H



See Subsurface Conditions section in the report for additional information.

FIGURE 3I



CLIENT: State of Utah - DFCM PROJECT: Durable Housing PROJECT NUMBER: 0128-098-14			KEY TO BORING LOG							
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF) % PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

COLUMN DESCRIPTIONS

① **Water Level:** Depth to measured groundwater table. See symbol below.

② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.

③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency.

④ **Depth (ft.):** Depth in feet below the ground surface.

⑤ **Blow Count:** Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.

⑥ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

⑦ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of

⑧ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.

⑨ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.

⑩ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

⑪ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.

⑫ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION	MODIFIERS	MOISTURE CONTENT (FIELD TEST)
Weakly: Crumbles or breaks with handling or slight finger pressure.	Trace <5%	Dry: Absence of moisture, dusty, dry to the touch.
Moderately: Crumbles or breaks with considerable finger pressure.	Some 5-12%	Moist: Damp but no visible water.
Strongly: Will not crumble or break with finger pressure.	With > 12%	Saturated: Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS	USCS SYMBOLS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material is larger than No. 200 sieve size.	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve.	CLEAN GRAVELS (little or no fines) GW
		GRAVELS WITH FINES (appreciable amount of fines) GP
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	CLEAN SANDS (little or no fines) SW
		SANDS WITH FINES (appreciable amount of fines) SP
		SANDS WITH FINES (appreciable amount of fines) SM
		SANDS WITH FINES (appreciable amount of fines) SC
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	SILTS AND CLAYS Liquid Limit less than 50%	ML Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
		CL Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Silty Clays, Silty Silts, Lean Clays
		OL Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%	MH Inorganic Silts, Mucous or Ductonaceous Fine Sand or Silty Silts
		CH Inorganic Clays of High Plasticity, Fat Clays
		OH Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS PT		Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications.

STRATIFICATION:

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"
Occasional: One or less per 6" of thickness	
Numerous: More than one per 6" of thickness	

TYPICAL SAMPLER GRAPHIC SYMBOLS

	Bulk/Bag Sample
	Standard Penetration Split Spoon Sampler
	Rock Core
	No Recovery
	3.25" OD, 2.42" ID D&M Sampler
	3.0" OD, 2.42" ID D&M Sampler
	California Sampler
	Thin Wall

WATER SYMBOL

Water Level



